Data needed to conduct exercises

Here is what MN uses when training offices in ArcView. We do this in four days. The first half of day to full day is dedicated to IT training like copy, paste, move, create folders, basic computer knowledge etc. Then I go through the training and exercise manual at the same time. Exercise 1 is a demo that I need to do more work on. I also wanted to add a section on joins, creating shapefiles, and I need to add a legend to load (for one of the exercises). I think I have included all of the files for the exercises to work, but you may want to customize it to your area so the local PT can adjust and relate easier. I also use the manuals created for the maintenance tool after I am through with my stuff. Then if there is time I take ten actual examples of everyday splits/recons/boundy changes/etc. from the county where the data came from as the classes sort of "test". Very good way for real life hands on situations. Hope this will help you all out. Let me know if I can be of any other help.
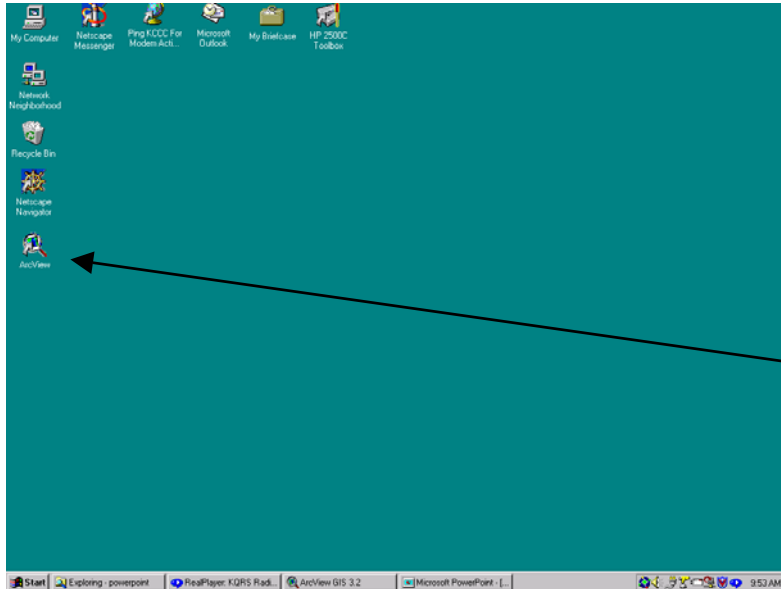

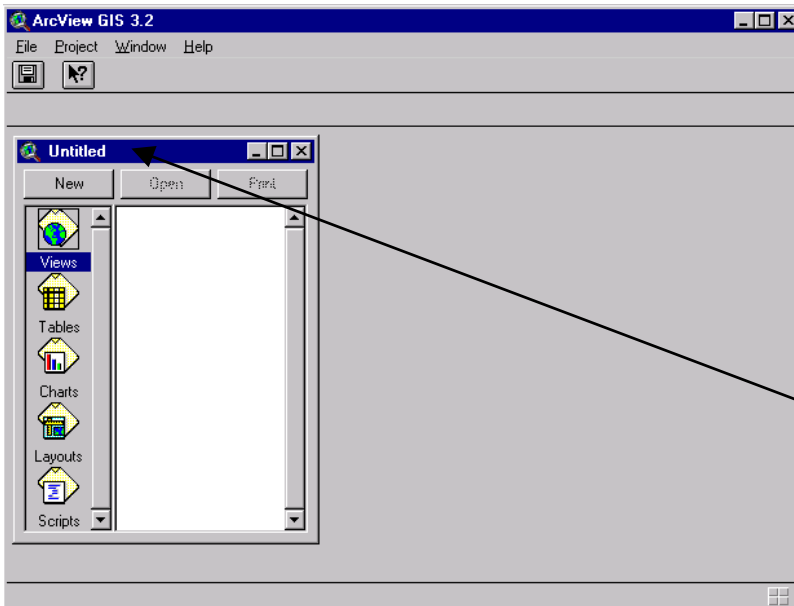Todd Anderson

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Exercise 1 - Getting Started with ArcView

1) Log on to your computer. The log-in is _____ and the password is _____

2) Start ArcView by double-clicking the ArcView program icon. Be patient while ArcView loads.


3) (If you get a "Welcome to ArcView"pop-up window, click Cancel. You can use that window to start but we will not.) What you see is the default starting point for ArcView. This is called the *default* project. It has an untitled project window which contains no documents.
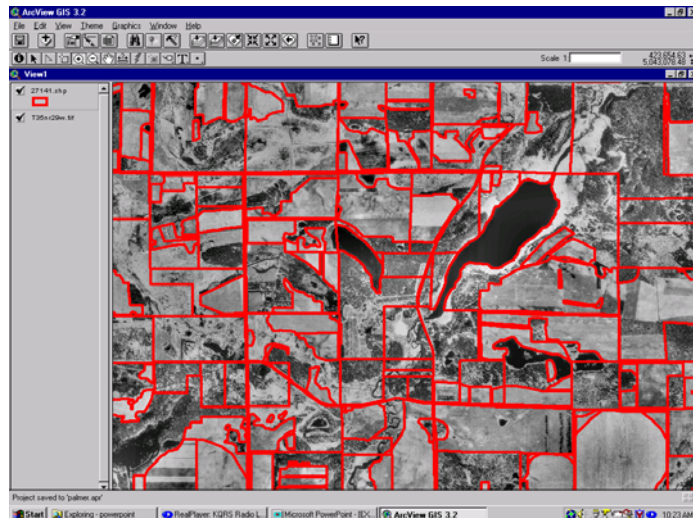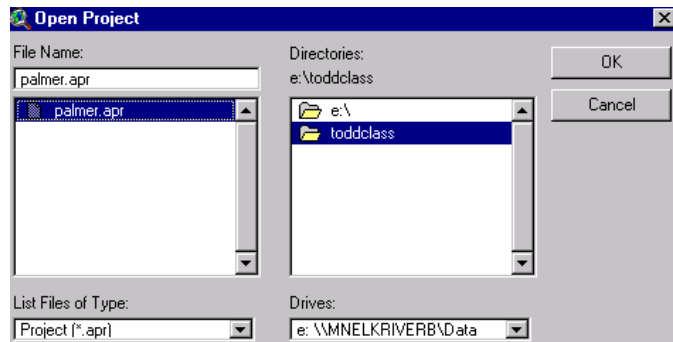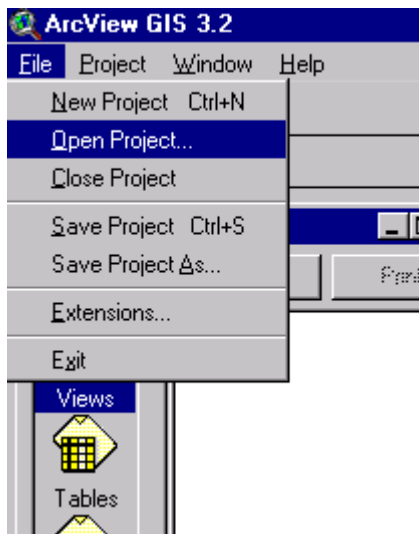
Exercise 1 - Getting Started with ArcView
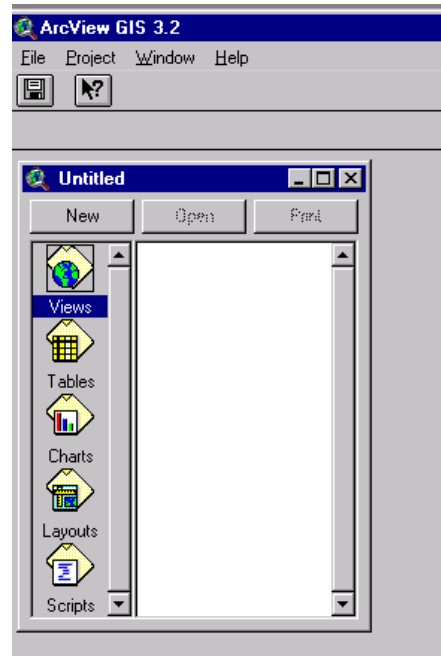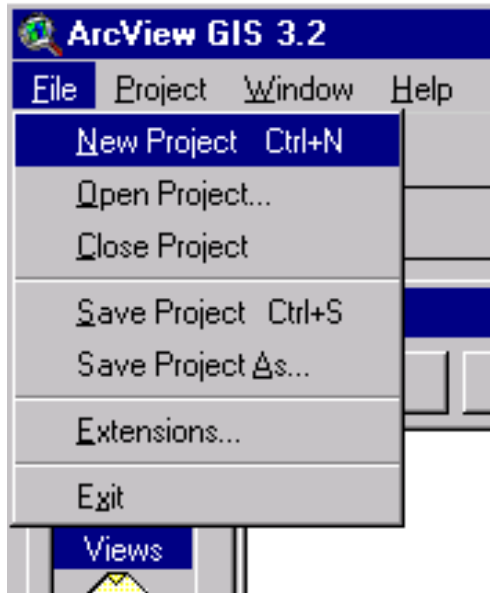
4) The first thing we want to do is open a new ArcView Project. To do this we use the **File** menu *New Project* option.

5) Open a view by double clicking the **View Icon** or click **New**. Adjust the ArcView Window to the size you want it on the screen. This is what it should look like.
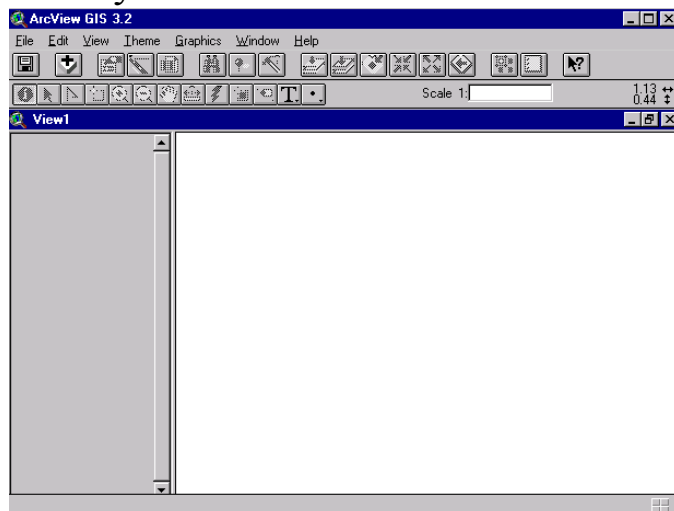
Exercise 1 - Getting Started with ArcView

5a) Use **File** menu, *Close Project* option to close this.

6) Once a project has been created and saved you can re-open it without adding all the Themes again. These project files are saved in a .apr format.

7) To open an existing project, use **File** menu drop-down and select ***Open Project .*** Maneuver to where it is located (c:\FSA training\palmer.apr), select it, and click OK. The project will automatically open up.

7a) Make sure View 1 is highlighted and click Open.

Exercise 1 - Getting Started with ArcView
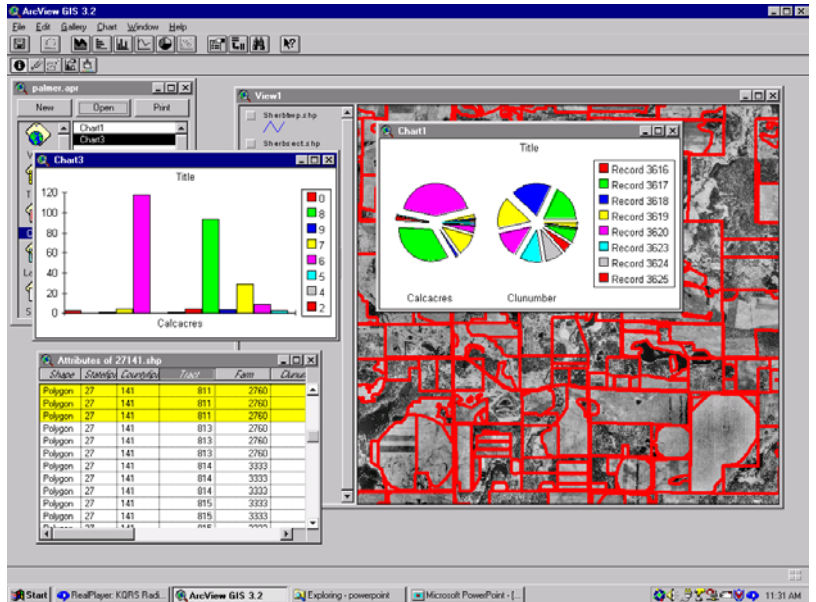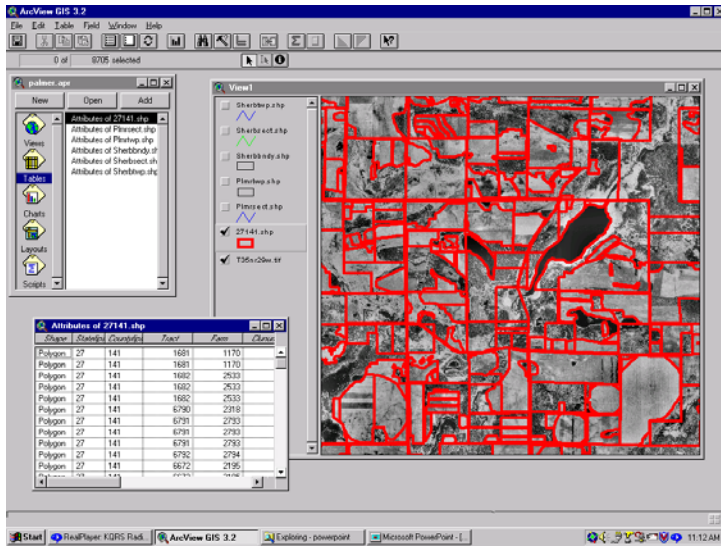
8) In the Project Window, use the mouse to click the Table Document Folder and make it active. You will see a list of the available table documents listed.

9) Using the mouse, highlight the table *Attributes of 27141.shp*. Then press the Open Button to open this particular table document. This table has the attributes that come with the CLU.

10) Now highlight the Chart Document folder and open the charts called *Chart 1* and *Chart 3*. These charts display the data from the table, *Attributes of 27141.shp*. *Chart 3* is a bar graph and *Chart 1* is a pie chart.

Exercise 1 - Getting Started with ArcView
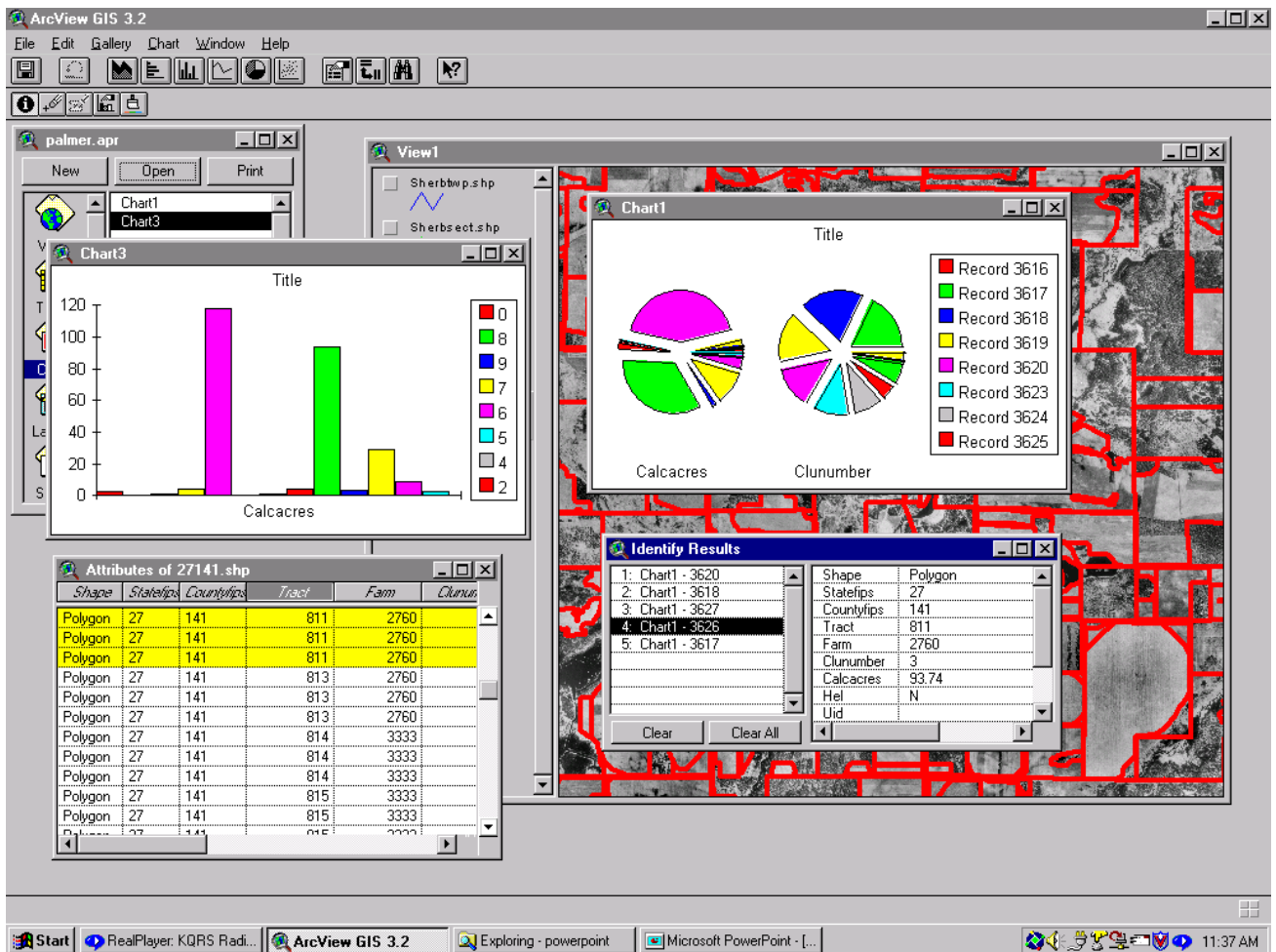
11) Let's try something. Make sure that Chart 1 is the active window. Then move the cursor onto that window. Notice that the cursor looks like a bulls-eye with an "i" next to it. This is the "Identify Tool" and it retrieves information about a particular slice of pie. Move the tool over a pie piece and click the mouse. What appears is a listing of the contents of the record in the database the slice represents. Close the window before continuing.

Exercise 1 - Getting Started with ArcView
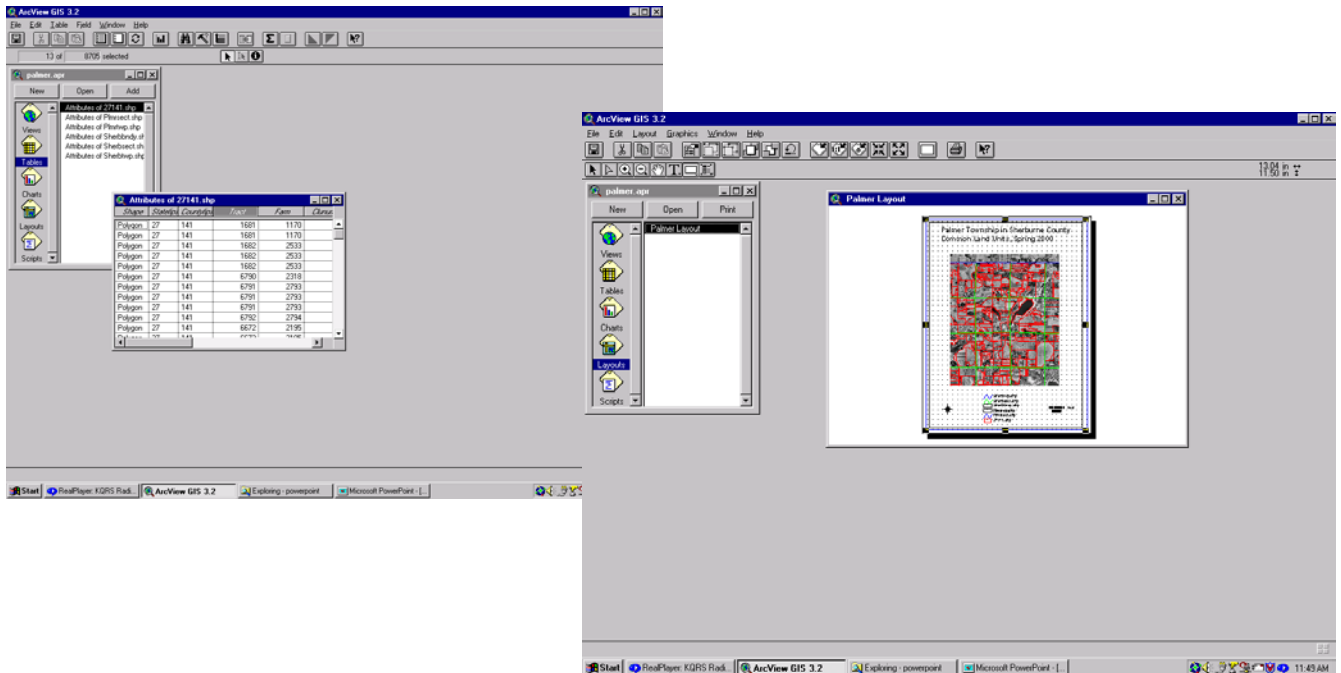
12) Now close the View, Table, and Chart Documents by clicking on the X in the upper left corner of each window. NEVER CLICK ON THE X IN UPPER LEFT OF THE ARCVIEW PROJECT/SESSION!!!
13) Go back to the Project Window and make the Layout Folder Active and open the layout called *Palmer Layout.*   As it draws you will notice that it looks just like a piece of paper. This is intended to show how it would look on the page. Notice the cartographic elements including a scale bar, north arrow and legend.
14) Now save the project. To do this use the **File** menu, *Save Project* option. The next time the project is opened, this is what it will look like.
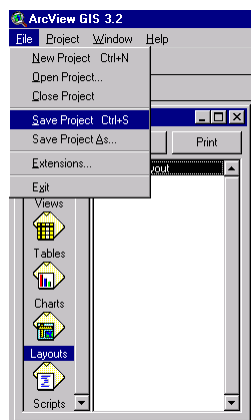
Exercise 1 - Getting Started with ArcView
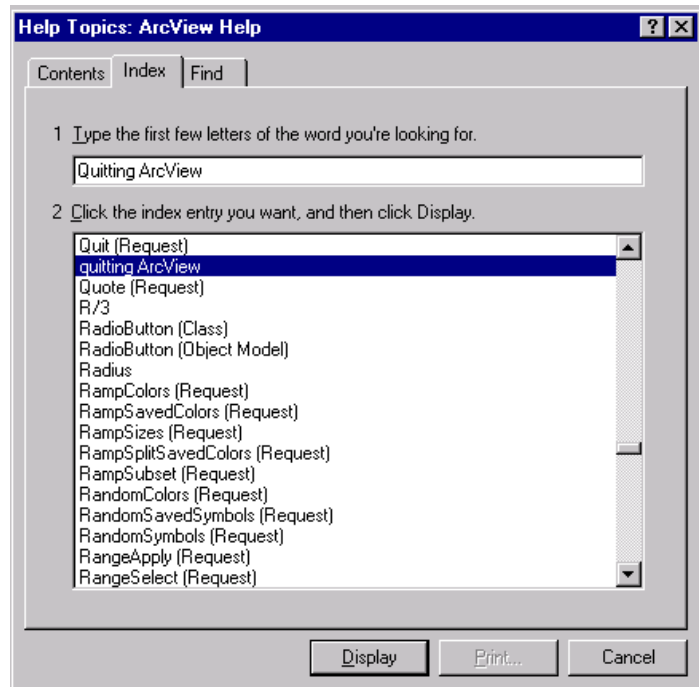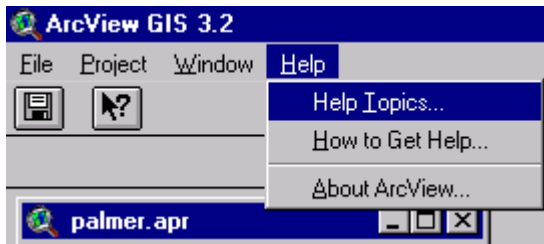
15) Start the ArcView Help system by selecting the **HELP** menu, *Help Topics...* option.

16) This will open the Help system. Let's search for a topic. To do this Press the *Index* Tab in the Help window.

17) Search for help on how to quit ArcView. Do this by typing "Quitting ArcView" in the search topics box. Double click on it and follow the directions and quit ArcView (the help system will also close).

Exercise 1- Getting Started with ArcView

Notes and Comments

Exercise 2 - The View
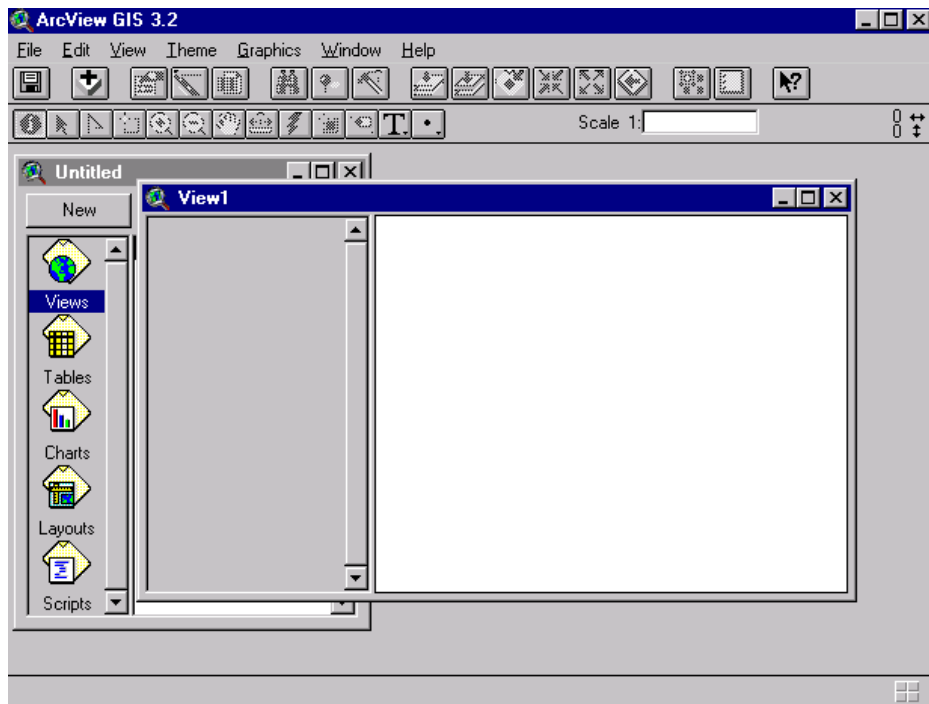
Introduction

As you have learned, ArcView can handle quite an array of data and data displays and that each type of display has it's own document type. We are going to start with the View document. This document is your window to the world (spatially). Since this may be the most important document you will work with, we will spend the most time on it.

The goal of this exercise is to teach you how to create a new project and add a View document to that project. You will be introduced to the Property sheets, an object that is very common throughout all of ArcView.

The project you create in this exercise will be used throughout this class, and other classes that follow. Remember to do things in order and complete each lesson.

One more tip. Read through each step from start to finish before you actually perform the process on the computer. There may be tips or hints at the end of the section that will make your life easier.

Exercise 2 - The View
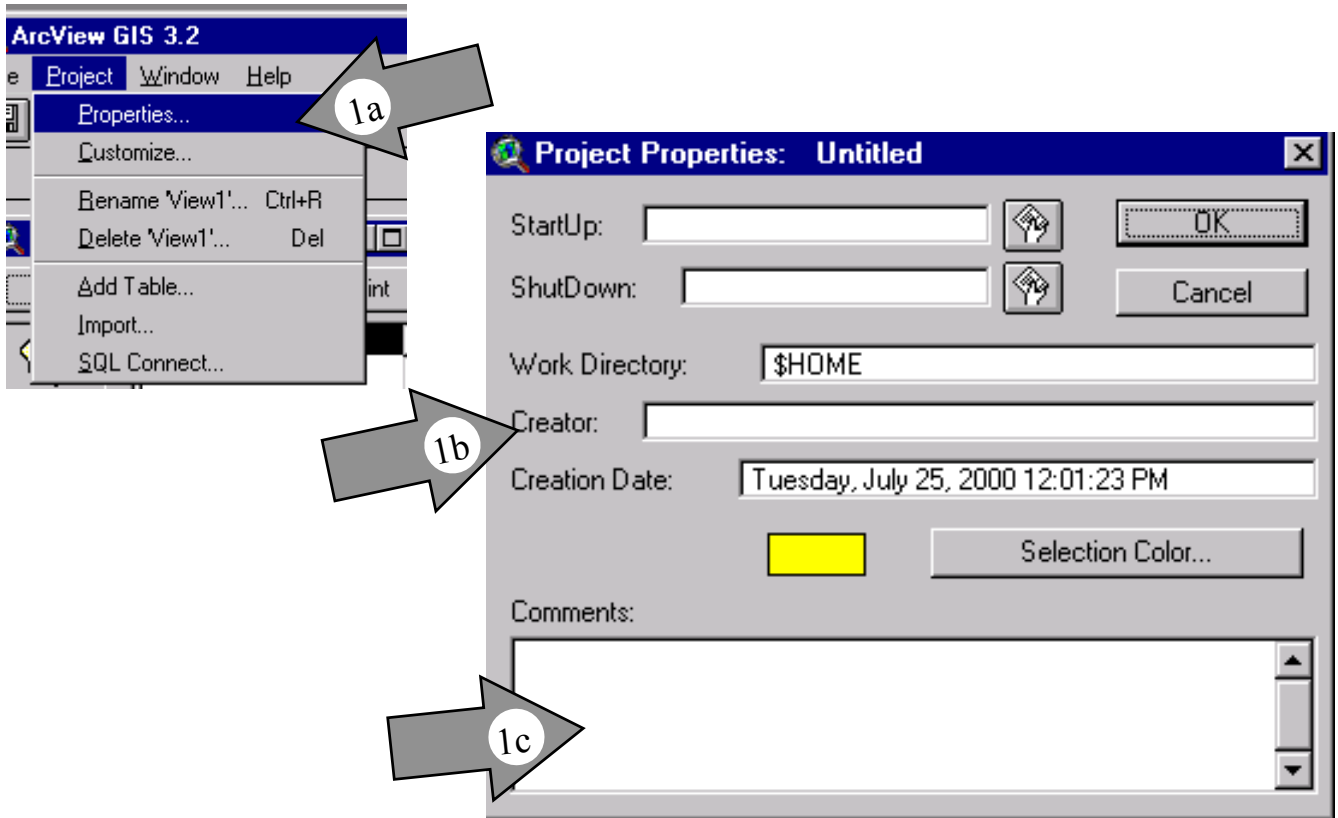
Start ArcView if it's not already running. Once it has loaded make sure you are in the default project (untitled) with no documents. Look at the Project window. Does it still say a project name?   If it does, use the **FILE** menu, *New Project* option to open a default project. This is where we begin.

1) We'll start by editing the Properties of the Project itself. Access the project's property sheet using the **PROJECT** menu, *Properties* option (1a), then change the Creator's name (1b) and the comments (1c).

Once finished, press the OK button to apply and close the property sheet.

Exercise 2 - The View
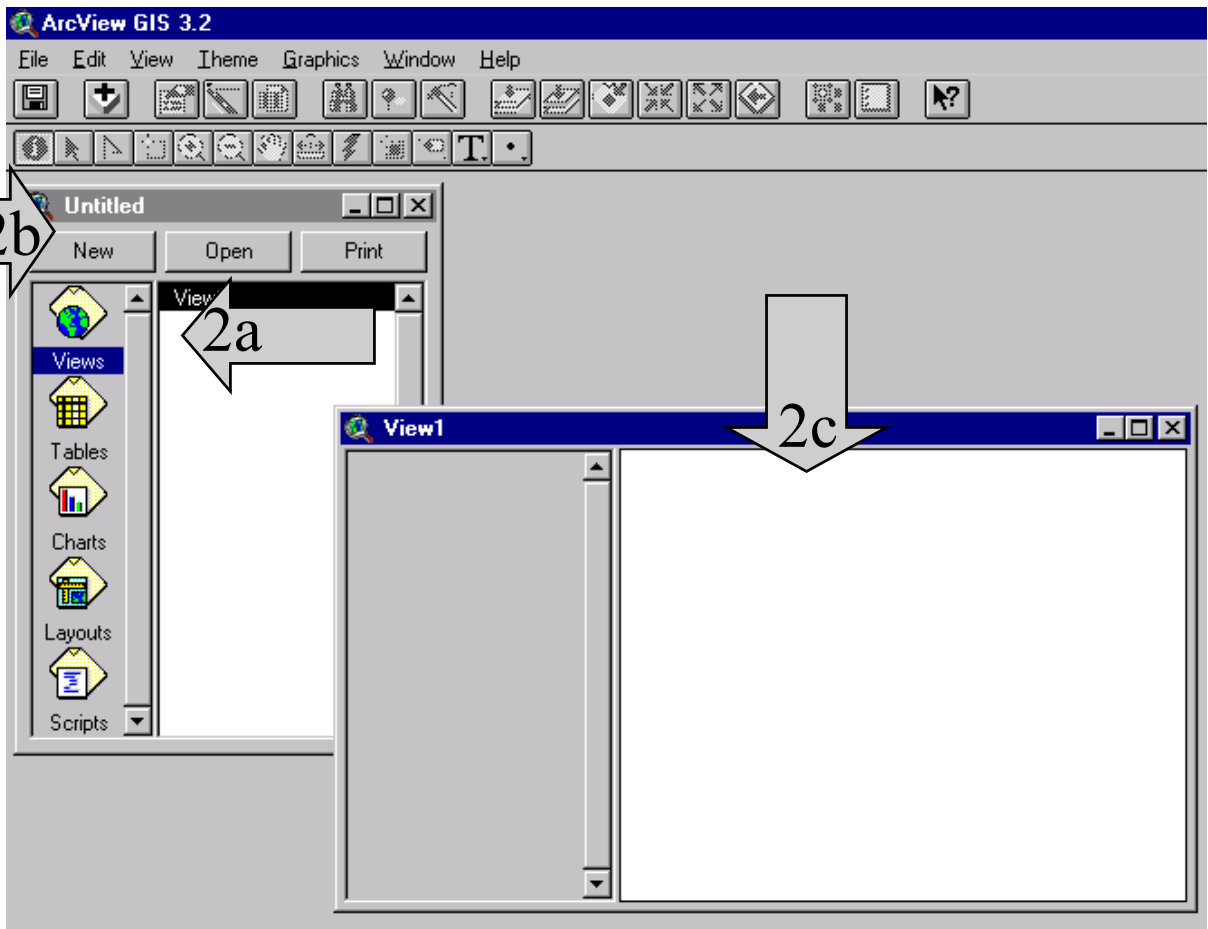
2) Now we want to add a View document to our Project. Do this by highlighting the View document folder in the Project window (2a). Then either double click the folder or press the New button(2b).

What you now have is an empty View document called "View1", the default name (2c). Notice that there is a map display window and a table of contents. But no themes. Also notice the new interface menus, buttons, and tools.

Exercise 2 - The View
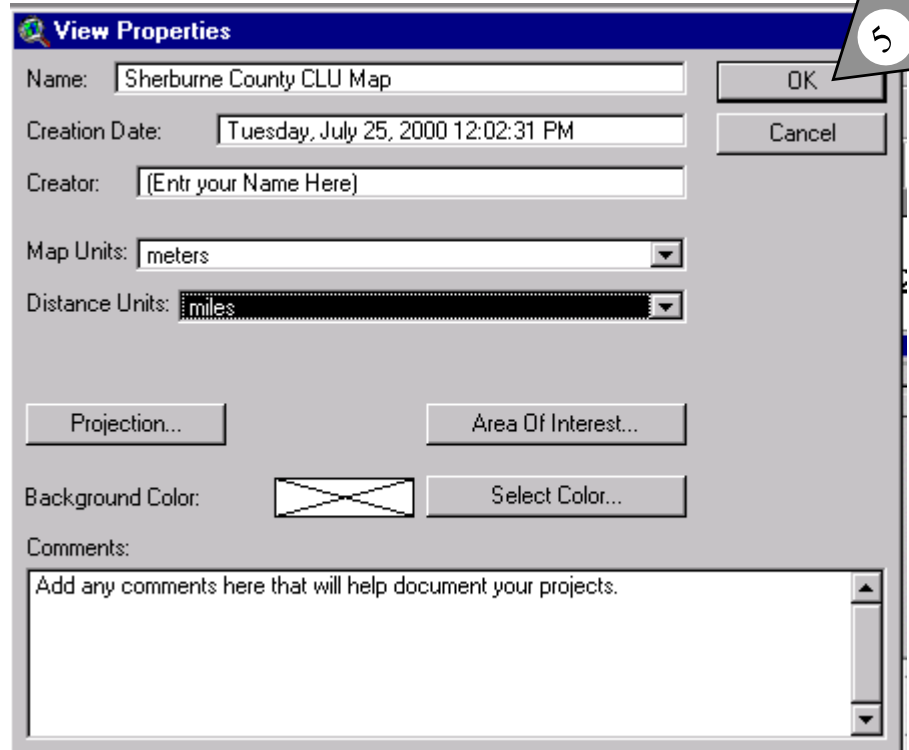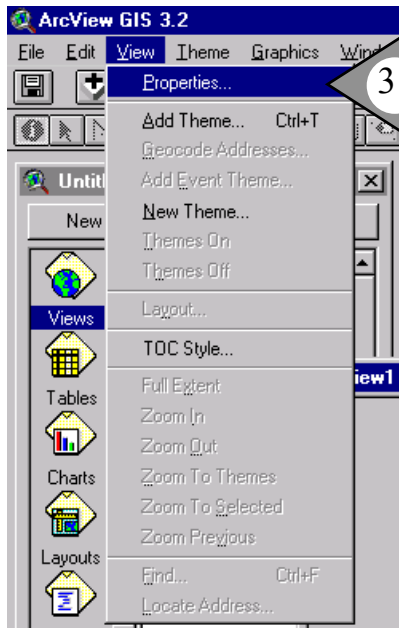
3) The first thing you will want to do after creating a View document is set it's Properties. This allows you and other user's decipher what you have done. Especially important if this is a seldom used project. Access the Property sheet using the **VIEW** menu, *Properties* option (3).

4) Using the Mouse change the following properties:
   Name: - Sherburne County CLU Map
   Creator: - (Enter Your Name Here)
   Map Units - Meters
   Distance Units - Miles
   Add some comments similar to above

5) Press the *OK* Button to close the Property Sheet (5)

Exercise 2 - The View
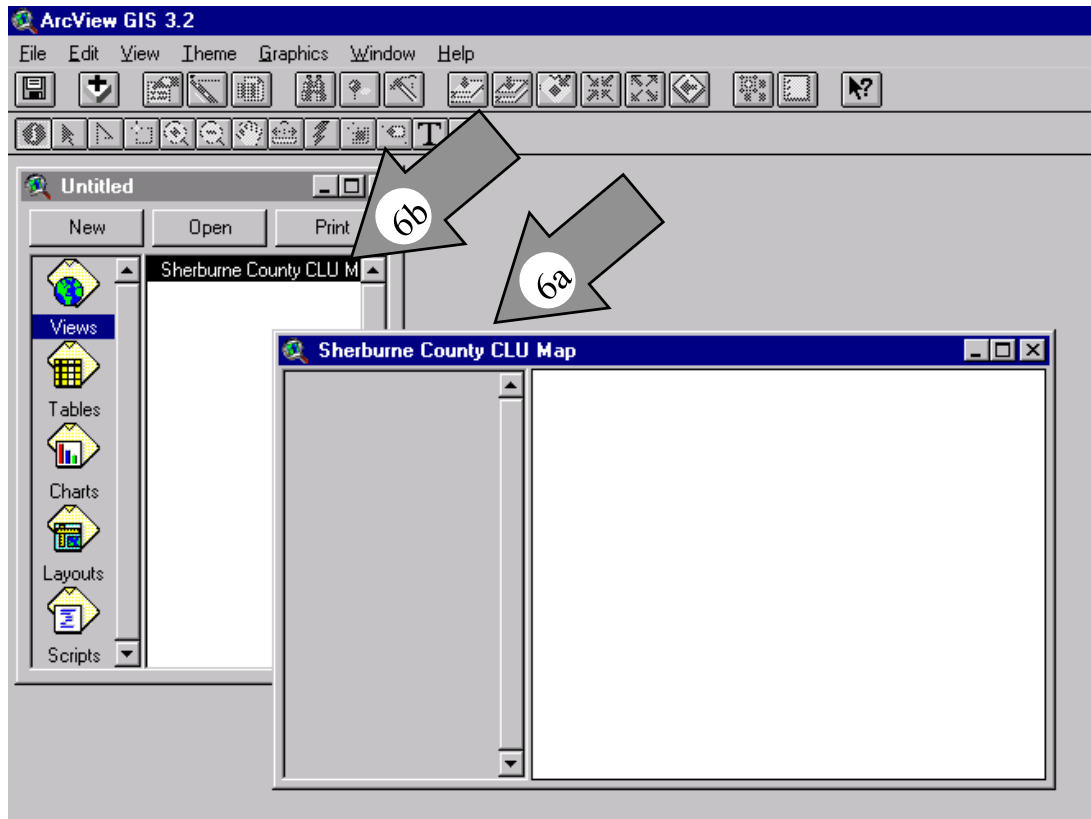
6) Now that we have added a View and changed it's name, the new name appears in the Document Banner (6a). Now look in the Project Window and make sure the View Document Folder is active. Notice that the View entry is now named based on the name in the property sheet (6b). Close the View.

7) Now, use the HELP system to find out how to save your project. Try using the **HELP** menu *Help Topics..* option to open the help system and then make sure the Index tab is active and then try to find out how to save a project. Save the project as:
    c:\FSA Training\sherbclu.apr

Exercise 2 - The View

Notes and Comments.

Exercise 3 - Themes
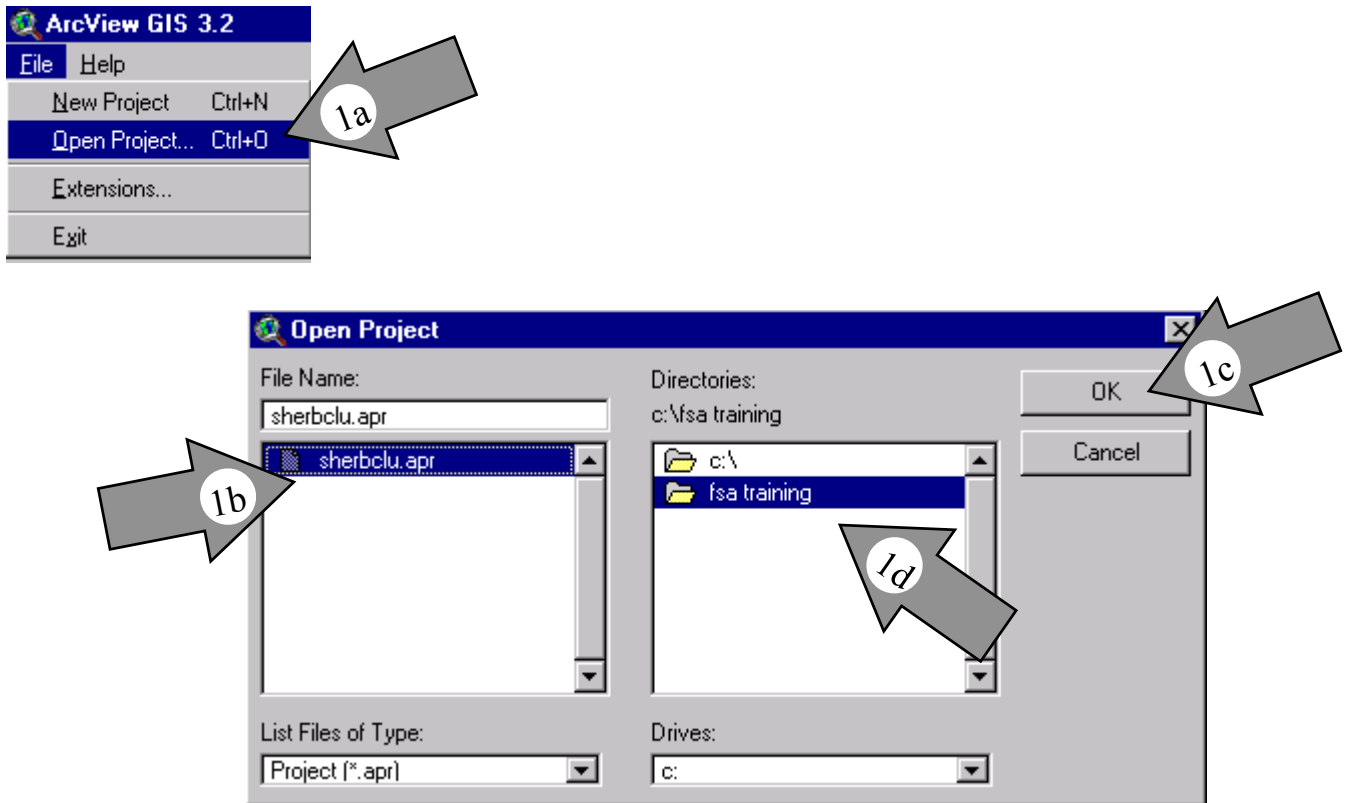
INTRODUCTION

A Theme is an individual map display housed within a View Document. Themes are built off of existing spatial data sources and many different Themes can be generated from a single source. Different classifications, colors, layout, queries, etc., all produce a variation on a specific layer. Themes also provide a basis to perform geographic analysis and queries. Themes are the spatial view of the data. In this exercise you will learn some of the basic tasks related to theme management by expanding on the project that was created in the previous exercise.

1) Make sure ArcView is started. If not, start it. Now load the project we created in the last exercise, sherbclu.apr. To do this use the **FILE** menu, *Open Project* option (1a) to open the file dialog box. Then select the project sherbclu.apr (1b), and press the OK button (1c). Remember that our working directory is C:\FSA Training\ (1d).

Exercise 3 - Themes
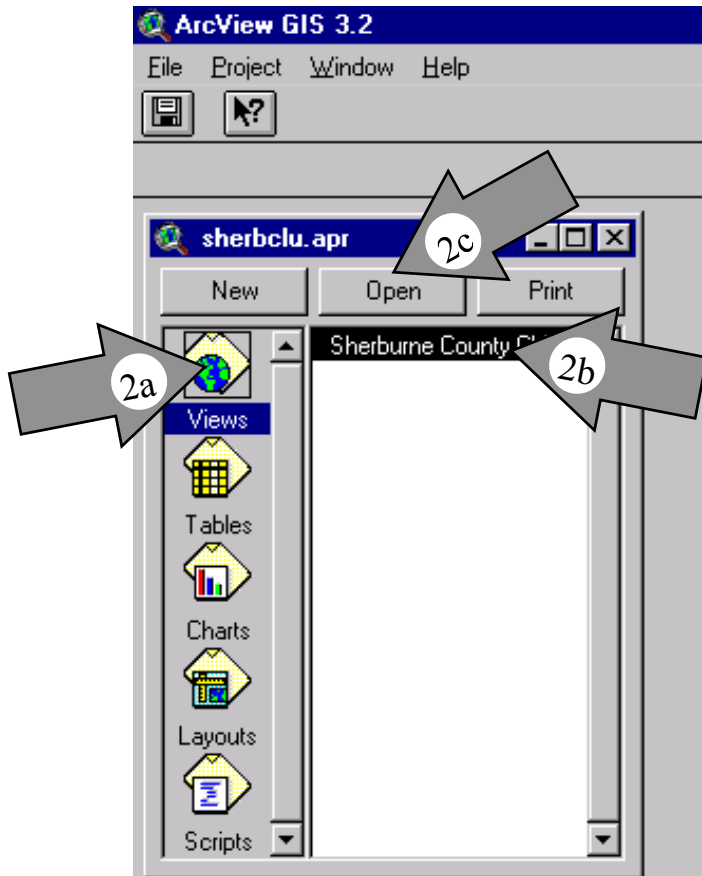
2) Once the project is loaded, open the View "Sherburne County CLU Map" by making the View folder active (2a), making the View active (2b) and pressing the OPEN button (2c).

The view will open and you will again notice that it does not have anything in it. You haven't done anything yet. That's about to change however.

Exercise 3 - Themes
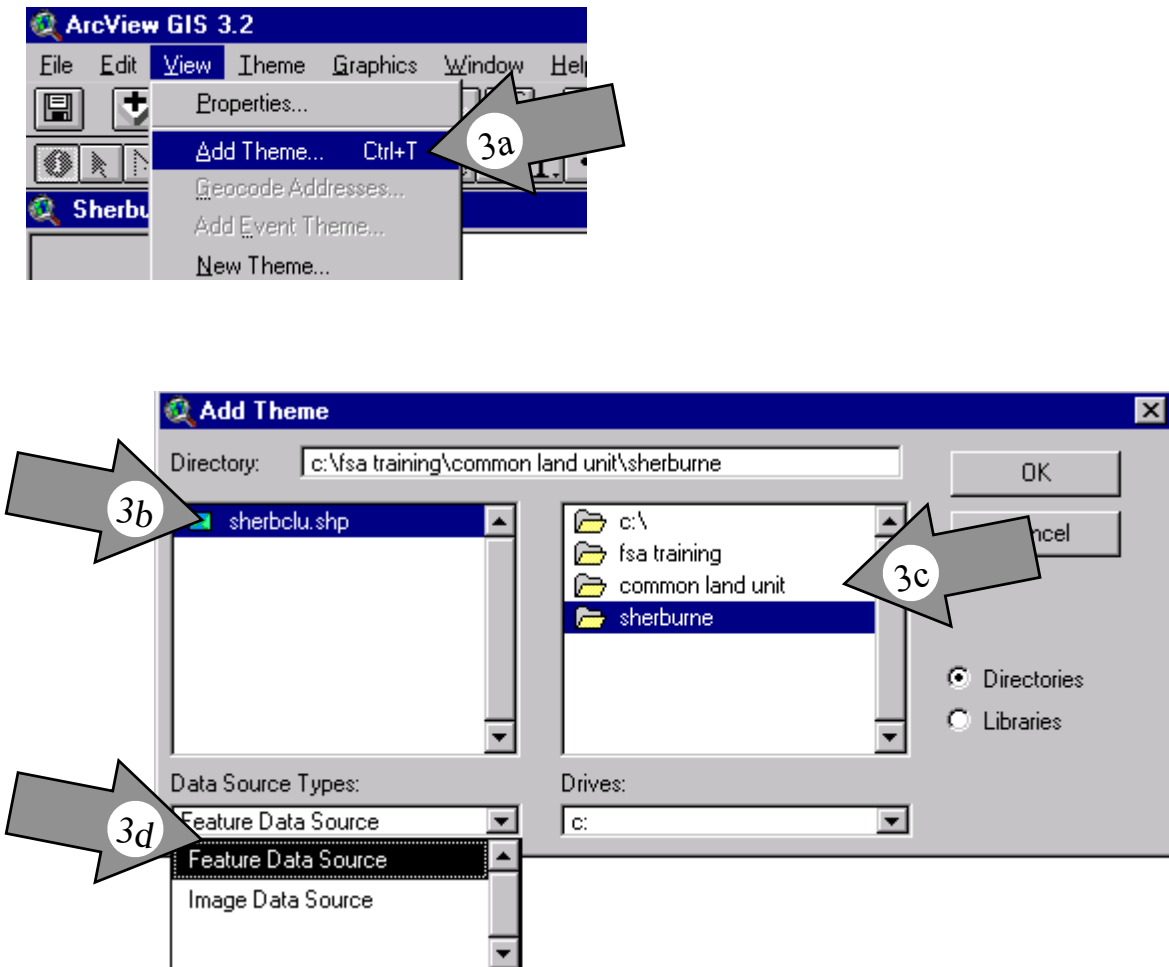
3) Now let's add a Theme to the View. Do this by pressing the **VIEW** menu, *Add Theme* option (3a). This will cause the Add Theme Dialog Box to be displayed. (You can also use the Add Theme Button on the button bar).

   Look at the dialog box, valid feature based data sources are listed in the left hand window (3b) while available directories are listed in the right hand window (3c) . Notice the Input box *Data Source Types (3d)*. It is set to Feature Data Source which are vector geographic data sets. If you wanted to add an image theme you would change this setting.

Exercise 3 - Themes
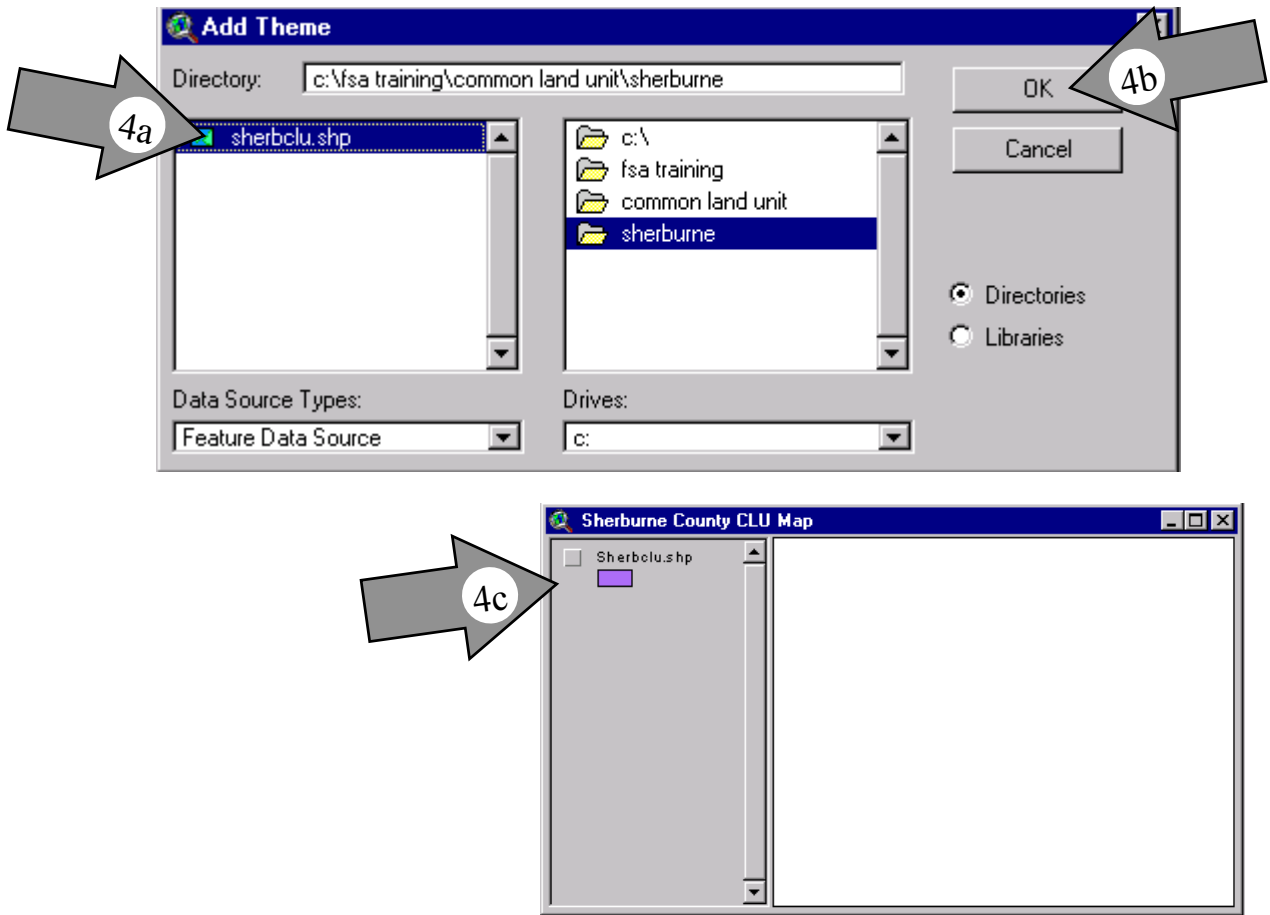
4) Let's start by adding the theme sherbclu.shp to the View. This is an ArcView shapefile of the common land units in Sherburne County, Minnesota. The data has one feature class. Classes you may encounter are polygon, line, annotation, and label point. Arc INFO coverages will show more than one feature class to choose from. Press the geographic folder (4a) to highlight the polygon feature file, and then click the OK Button (4b).

A default Legend will be created for the theme consisting of a single class with a default color (4c). The theme will also be assigned a default name based on the file name of the shapefile sherbclu.shp. It will then be added to the View and the legend will appear in the Table of Contents. Draw the theme on the screen by clicking the Display box in the left hand side of the legend. A map of the common land units in Sherburne County will appear. Notice that the theme is also active.

Exercise 3 - Themes
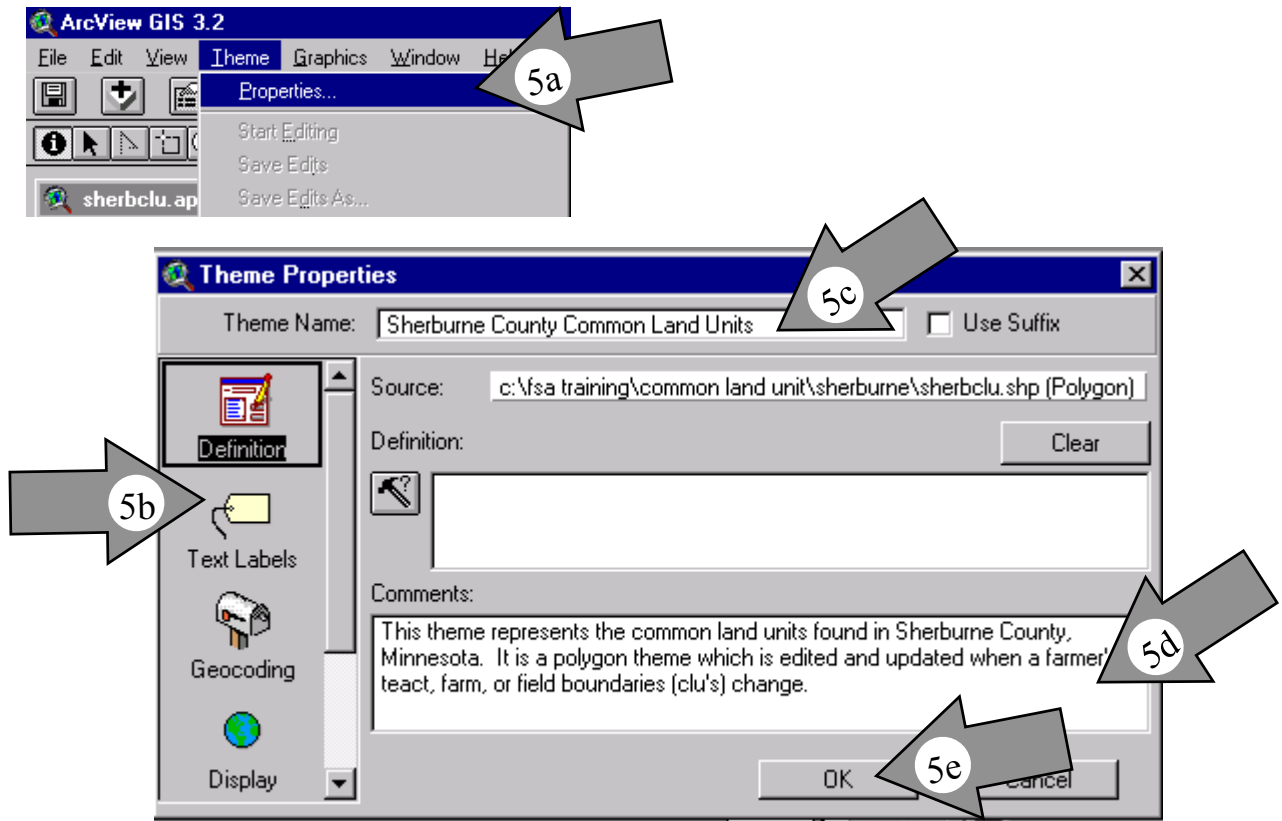
5) Before we continue let's set a couple of properties for this Theme. Access the Theme Property sheet by selecting the **THEME** menu, *Properties* option (5a). On the left side of the sheet is a scroll box with a number of icons representing the different types of properties (5b). In this example, we are going to modify the name of the theme and add some comments so that we know what the theme represents.

Set the **Theme name** to "*Sherburne County Common Land Units*" (5c)
Set the **Comments** to :

 "*This theme represents the common land units found in Sherburne County, Minnesota. It is a polygon theme which is edited and updated when a farmer's tract, farm, or field boundaries (CLU's) change.*" (5d)

Press the *OK* button to apply and close the Property Sheet (5e).

Exercise 3 - Themes
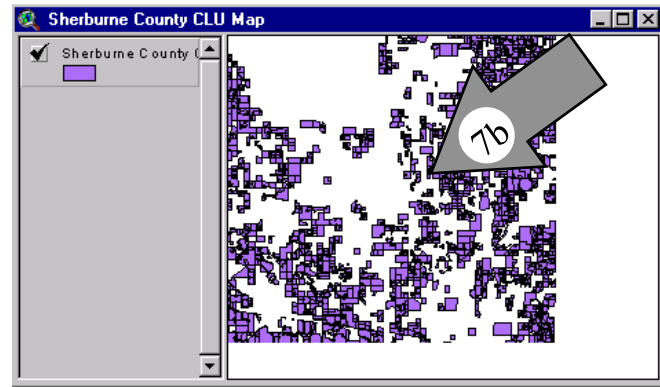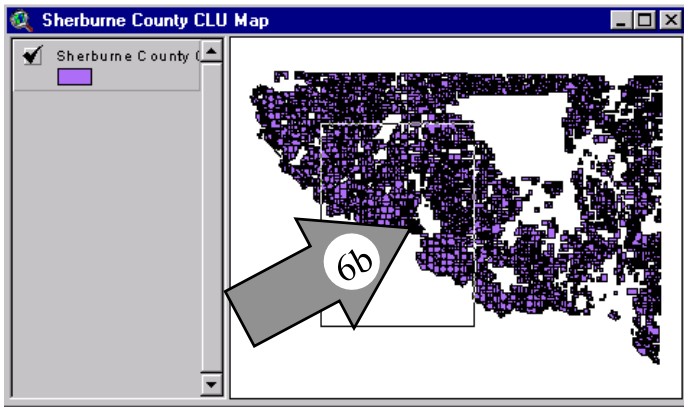
6) Let's learn how to use some of the View document tools. Start with the ZOOM tool (6a). This tool allows you to zoom in on areas that you specify using the mouse. Try it. It's easy and fun too. You can zoom in on a point using a single click or zoom in on an area by clicking, holding and dragging the mouse (6b). The zoom out tool is used in the same manner.

7) Once you zoom in you may want to pan around. This is accomplished using the PAN tool (7a). This tool appears as a little hand on the View document and when you press and hold the left mouse button, you can pan the View by dragging the mouse (7b). Once you release the mouse the View will be redrawn.

8) Now zoom out to the maximum extent of the data and view the entire state again. This is easy but you don't know how to do it do you. Hey, use the HELP system to find out. Start by using the **HELP** menu, *HelpTopics...* option. Once the search window appears, type "*ZOOMING to full extent*". Display the help and follow the instructions. Then close the help system.

Exercise 3 - Themes
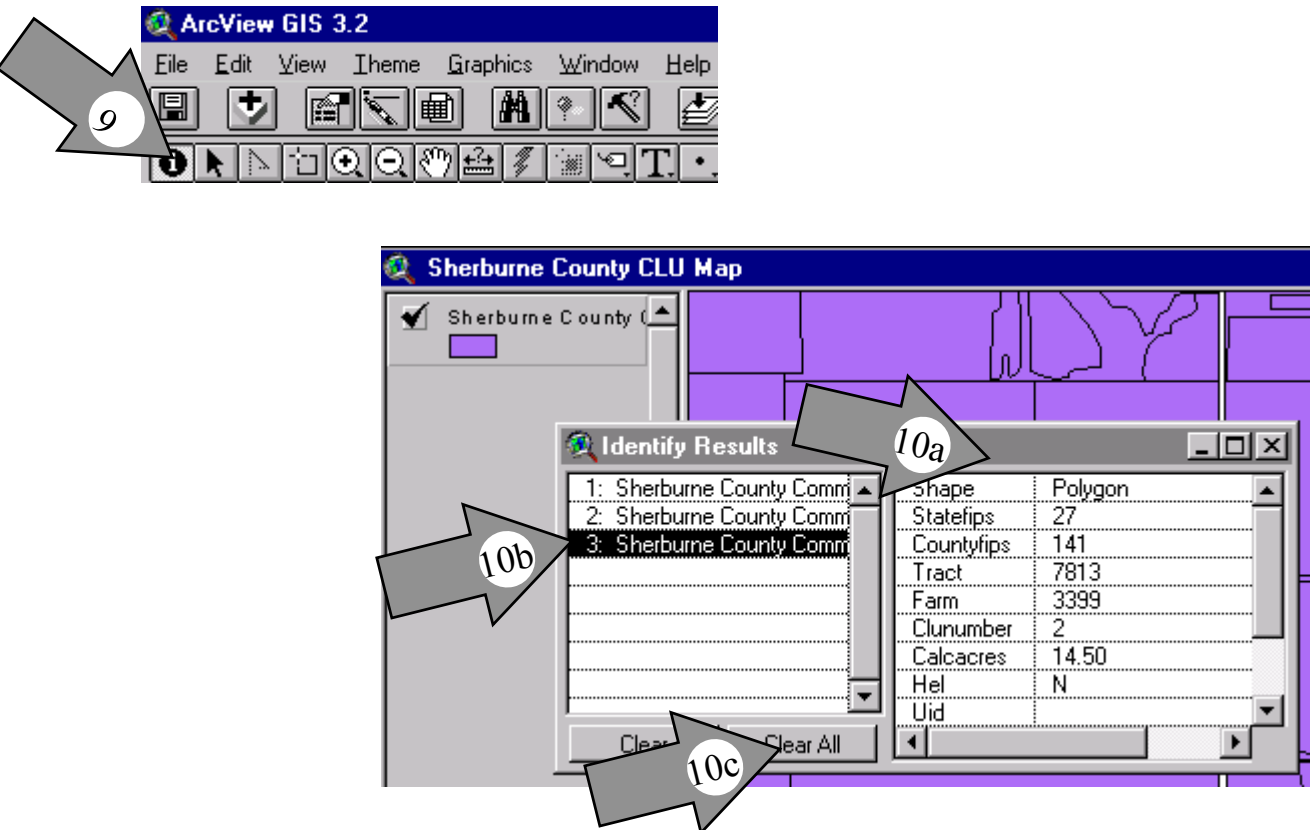
9) Remember the identify tool you used on the pie slice in the first exercise? We can also use this on the View document to retrieve information about theme features. The IDENTIFY tool is the left-most tool in the toolbar (9). Make it active. To retrieve information about specific polygons, make sure that the "*Sherburne County Common Land Units*" theme is active, move the cursor over the display window and click on a county polygon.

10) What will appear is a display box that shows the information listed in the attribute table for the polygon you selected (10a). Click on other polygons. Notice how the identify window contains a record of each polygon you selected (10b). You can scroll up and down the box to view the attributes and also move up and down the selection list.

Clear the list (10c) and close the identify window.

Exercise 3 - Themes
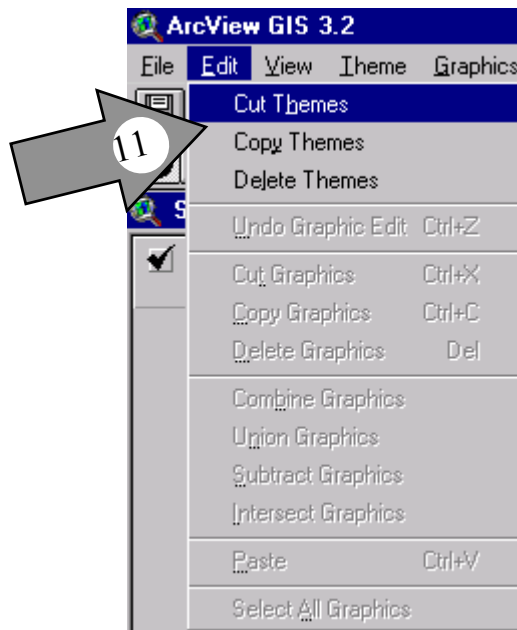
11) Themes can be *Cut, Copied and Pasted* just like text in word processing documents. Let's try it. Using the **EDIT** menu, *Cut* option the theme will be removed from the View and placed in the clipboard (11). Now use the **EDIT** menu, *Paste* option to paste the view from the Clipboard onto the View. This is really functional if you create more than one view and want to move themes from one view to another.

The Clipboard is a Windows thing. It is a place in the computer's memory that stores things that window's programs can access. You can put one thing on the Clipboard (copy or cut), and then retrieve that thing from the clipboard and put it in your document (Paste). If there is something in the clipboard when you Copy or Cut, it is replaced by the new object.

In ArcView, what we Cut, Copy, or Paste depends on the type of document is active.

Exercise 3 - Themes

12) Remember that Themes also have data tables. Remember the information that was listed in the Identify tool window? It came from the theme attribute table for the Common Land Units in Sherburne County. Let's open that table. Make sure the "*Sherburne County Common Land Units*" theme is active and then use the **THEME** menu, *Table* option (12a) or use the OPEN TABLE button. Check out the and the data in the table (12b).

13) Close the Table and the View documents. Then go to the Project Window and highlight the Table folder (13). See the folder listed? It's the theme attribute table you opened just a minute ago, it's called "*Attributes of Sherburne County Common Land Units*".

14) Now quit ArcView. Use the **FILE** menu, *Exit* option. Either save changes if sherbclu.apr has already been saved or save as sherbclu.apr. Save it to C:/FSA Training then close ArcView.

Exercise 3 - Themes

Notes and Comments.

Exercise 4 - Classifying and Symbolizing Themes

INTRODUCTION

Up to this point you have created a View, set its properties, added a Theme to the View, set theme properties, opened a theme attribute table and done some basic theme navigation. The next step in this process is to customize the Theme so that it displays "Information" rather than just data. This involves classifying (or slicing and dicing) the data and symbolizing it so that it displays the information we wish to convey or to view the data trying to find some meaningful relationships.

This is actually a fun, yet tedious part of developing theme displays. Especially if you are working with a theme that has a lot of classes. Sometimes getting the display just right for map production can take some time.

Before we do anything, make sure ArcView is up and running. Once it is, load the project sherbclu.apr. You've learned how to do this. If you can't remember, use the Help system.

Exercise 4 - Classifying and Symbolizing Themes
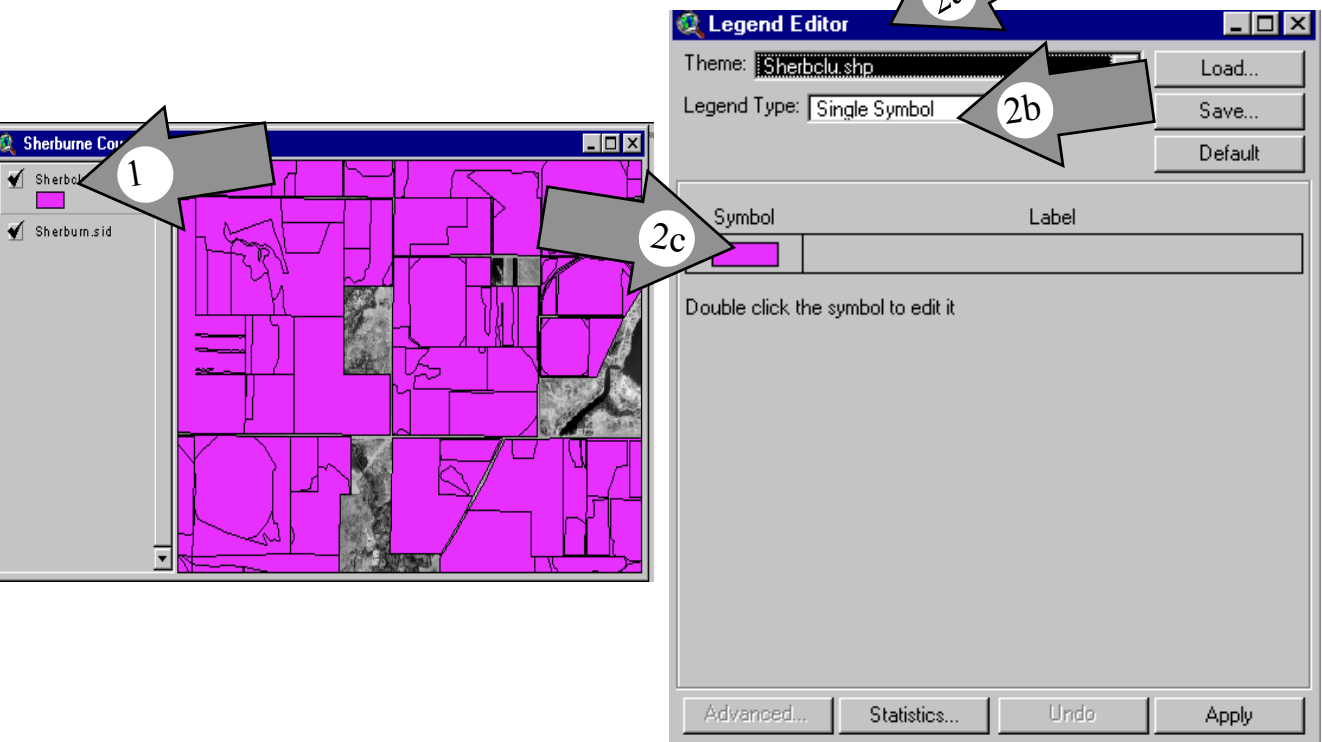
1) We will start by symbolizing the Theme "*Sherburne CLUs*" in the
   View, "Sherburne County CLU Map". We need to begin by making
   the View folder active (its in the Project Window) and then open the
   required View. We want to use this Theme to edit the CLU. This
   means we would like to be able to see the aerial photography behind
   it. We will want to make this coverage transparent so we can see
   through it. To do this we will use the Legend Editor in conjunction
   with some Palettes. To edit the legend for the "*Sherburne CLU*"
   theme, double click it's legend area in the Table of Contents (1).

2) This will bring up the legend editor (2a). Notice that you are not
   classifying this data set in any way. All polygons are to be colored the
   same. Thus our Legend Type will be Single Symbol (2b). What we
   want to do is change the colors of the polygons which is done in the
   Palette manager. Access the Palette Manager by double clicking the
   color patch in the legend window of the Legend Editor (2c).

Exercise 4 - Classifying and Symbolizing Themes
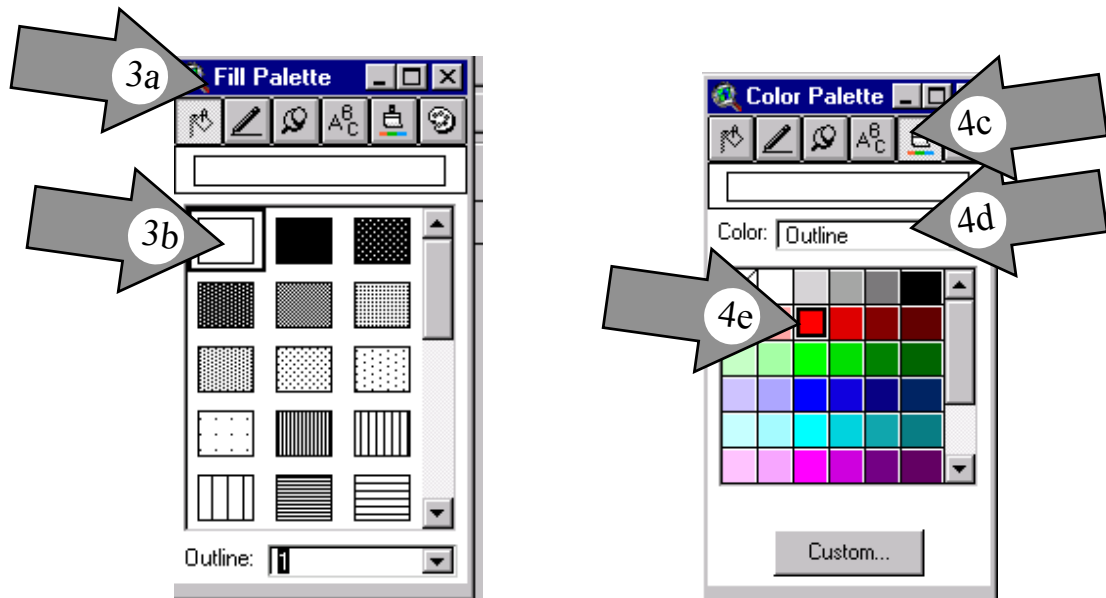
3) After a second, the Palette manager will be displayed and the Fill Palette (3a) will be active. Make sure the fill is outline (top left choice) (3b). At the bottom change the line width to at least a thickness of 1.

4) Then press the Color Button at the top of the palette (4c). Change the color to Outline (4d) and select the color you want your CLUs to be. Let's go with red (4e). Click Apply in the legend editor to have the changes reflect in the View. It will help if you move the palette window so you can see the Legend Editor as you change the colors. That way, you can preview the color changes in the Legend Editor.

Exercise 4 - Classifying and Symbolizing Theme
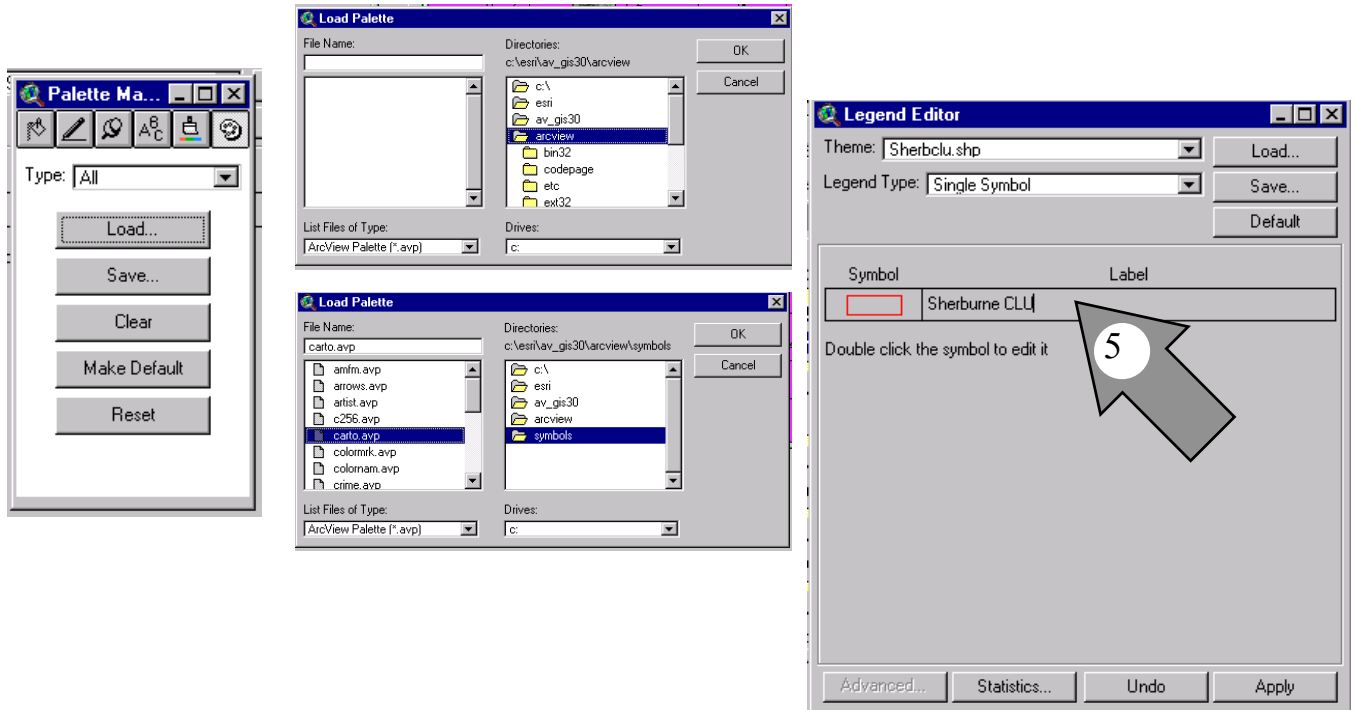
5) To select something and have it display in yellow (the default) select the *Palette Manager* button (far right), click load, and maneuver to the symbols folder under c:\ESRI\av_gis\arcview. Choose the *carto.avp* file and click the OK button. You will now want to go back and change your choice of the *fill palette* to one with a pattern. Be sure that in your *color palette*, both the *foreground* and *background* color are transparent (the X in the upper left corner).

Now set the legend label by clicking the cursor in the Label column and typing "*Sherburne CLU*" as the description of this classification (5).

To make the changes appear on the View, press the APPLY button in the lower left hand corner of the Legend editor.

Close the Legend Editor. Also close the View document window.

Just to be safe, let's save our project by pressing the SAVE button

Exercise 4 - Classifying and Symbolizing Themes
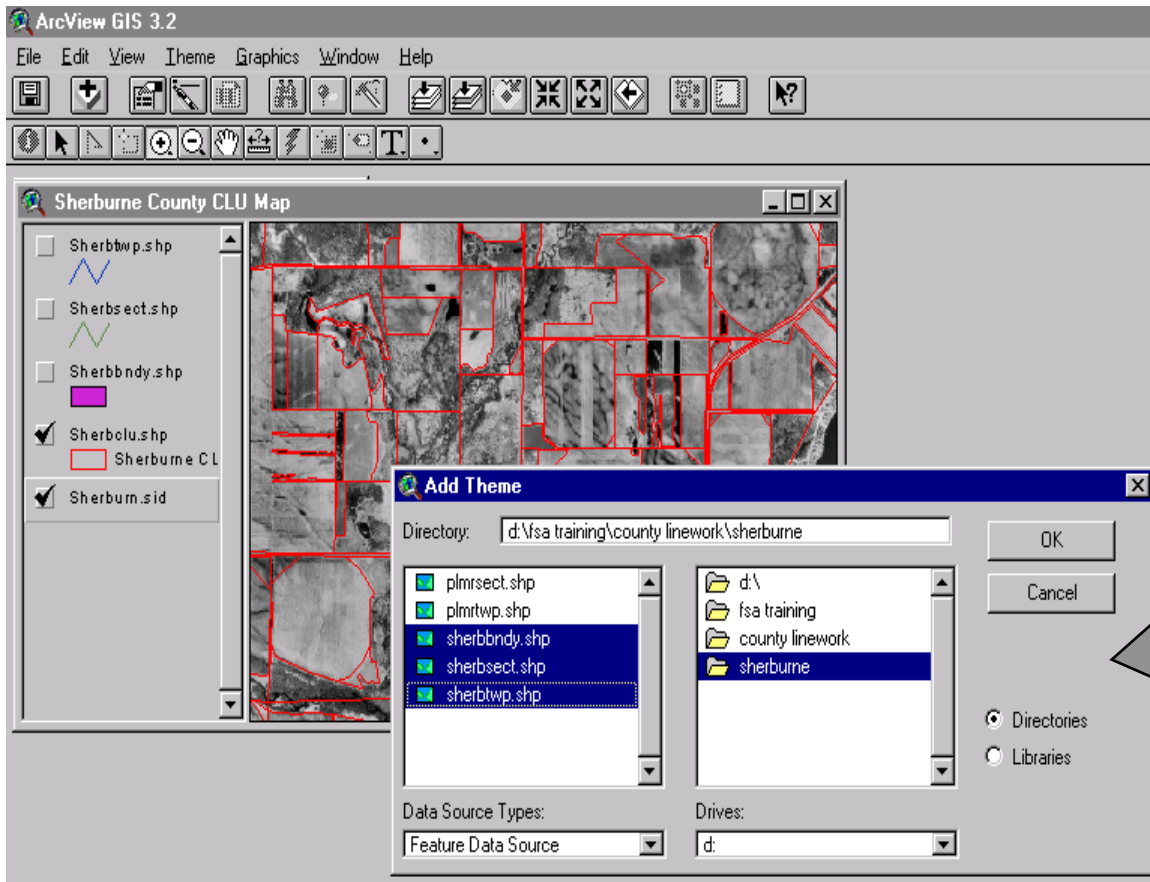
6) We will now display a number of data layers for Sherburne County. Add the themes of *sherbndry.shp, sherbsect.shp, and sherbtwp.shp* (6). These data layers are commonly available to all FSA ArcView users. We'll use this class not only to get a feel for ArcView but also to get an idea of the data that are available for your staff.

If you get stuck use the **Help** system.

Exercise 4 - Classifying and Symbolizing Themes

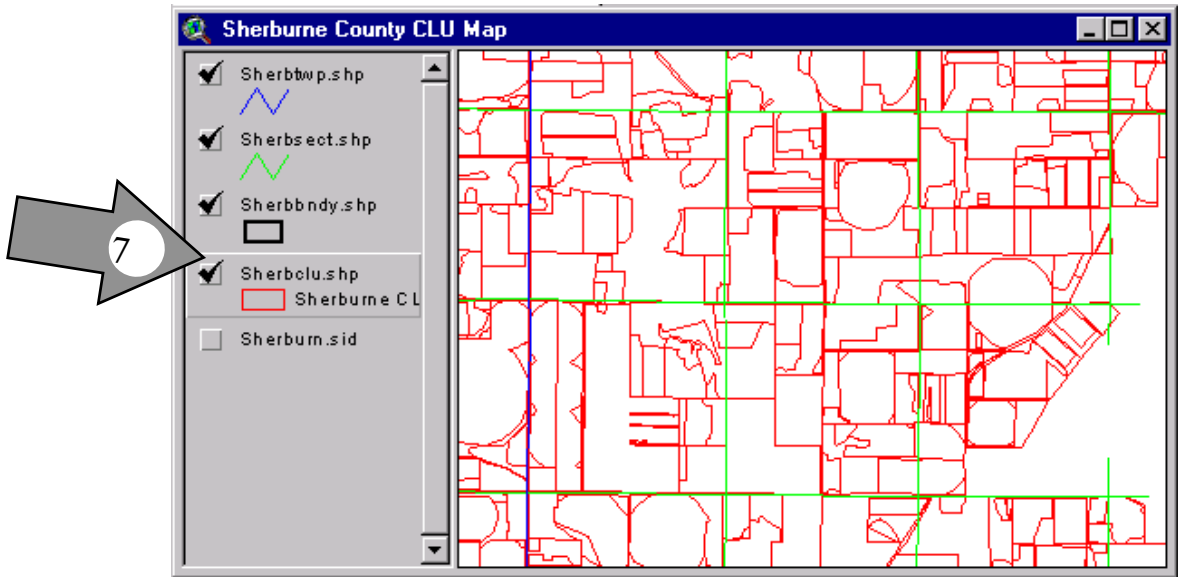7) After you add the themes, change the theme property sheet. Remember that you will have to make each theme Active before accessing the Property sheet using the **THEME** menu, *Properties* option. Make the following changes to the theme names and descriptions:

Theme	Theme Name	Theme Comments
sherbbndy.shp	County Boundary	Sherburne County Boundary lines from Minnesota DNR base map
sherbsect.shp	Section Lines	Section lines from Minnesota DNR base map
sherbtwp.shp	Township Lines	Township lines from Minnesota DNR base map

Turn on and off the themes, one by one, by clicking on the display box (7). Make sure they are all off before continuing.

Note that these are all feature based themes. They display vector based information that has an associated attribute table. ArcView also has some limited image display capabilities so let's take advantage of them.

Exercise 4 - Classifying and Symbolizing Themes
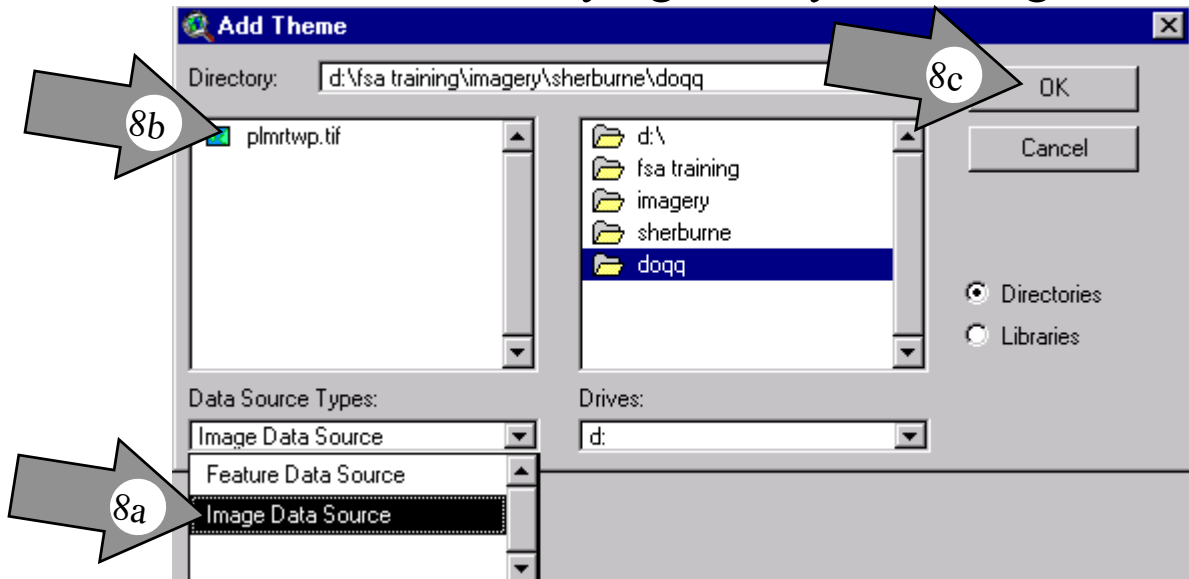
8) There are a couple of image based themes available, a compressed
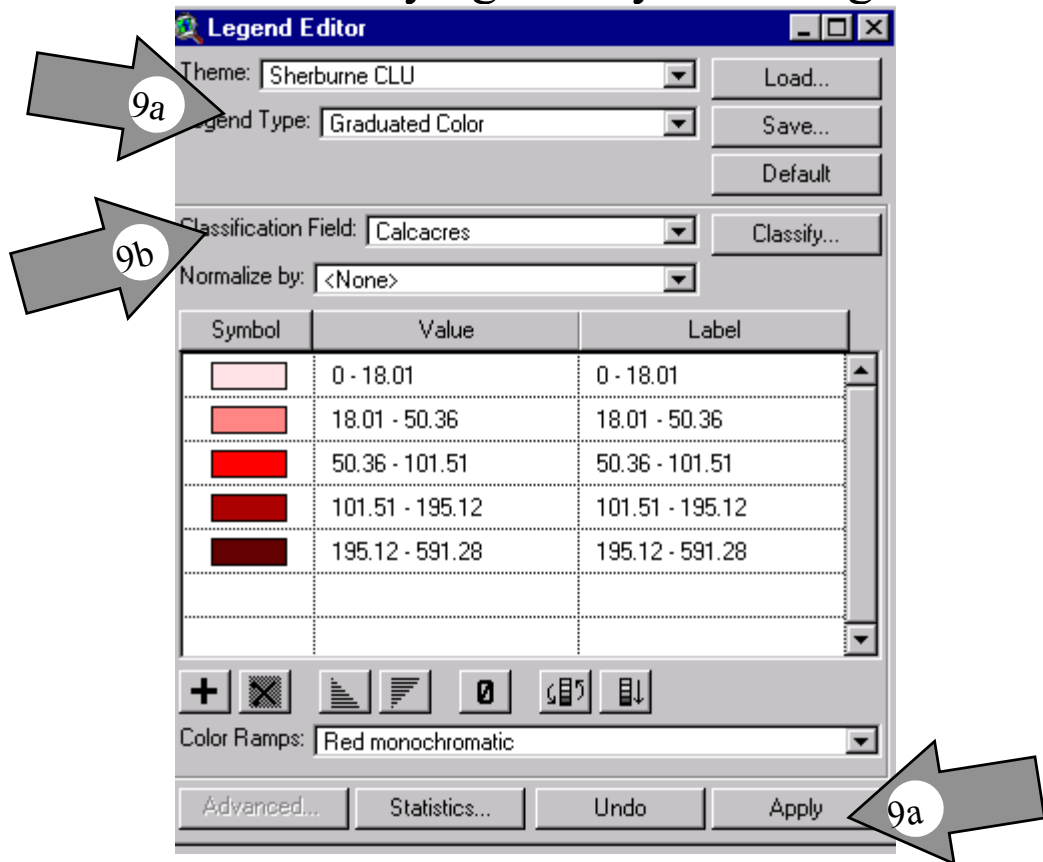MrSids file format or uncompressed .tiff format.   They can be
Added to the View just like the feature based themes. To add it to
the View use the same technique you would use to add feature
based themes.

To list the image based themes, change the *Data Source Type* to
Image Theme (8a). Look for an image called plmrtwp.tif (8b).
Make it active and click OK to add it to the view (8c). Then change
the property sheet for this theme so that the name is set to "County
TWP TIFF Image". Keeping on top of you property sheets is
important, you do know how to do it? Right!? (use the help if you
can't remember) Repeat this sequence to bring in the MrSIDS
imagery if not already in the view. You will have to turn on the
MrSids file extension reader under the "extensions" option in the
file drop down menu on order for ArcView to read it. Name that
the "County SIDS File".

Now click the Display check boxes for all of the themes to draw
them on the screen. The first thing you will notice is that the images
covers all of the other data right up. That's because it was the last
theme we added and therefore, the last to draw. We can change the
drawing order by moving them to the bottom of the Table of
Contents. Do this by using the mouse to click-hold-and-drag the
legend for the image.

Exercise 4 - Classifying and Symbolizing Themes

Legend Editor

| Theme: | Sherburne CLU | | Load... |

Legend Type: Graduated Color — Save... / Default

9a

Classification Field: Calcacres — Classify...

9b

Normalize by: <None>

Symbol	Value	Label
	0 - 18.01	0 - 18.01
	18.01 - 50.36	18.01 - 50.36
	50.36 - 101.51	50.36 - 101.51
	101.51 - 195.12	101.51 - 195.12
	195.12 - 591.28	195.12 - 591.28

Color Ramps: Red monochromatic

| Advanced... | Statistics... | Undo | Apply |

9a

9) Let's turn everything off for now until we can make some better order of our data.

Now let's try to classify our "CLU" theme. Bring up the legend editor by double-clicking on the theme legend. We want to display this data based on the acreage of the CLU data. This is a Graduated Color Legend (9a) that is created based on the data that is stored in the attribute table in an item (field) called *calcacres* (9b).

The Values in the data represent different ranges of acres. Ideally, we may want to see different ranges rather than numbers show up in our legend. Modify the labels as shown and click the *Apply* button (9a) for the legend to take affect. Then close the Legend Editor and the Palette manager windows.

Exercise 4 - Classifying and Symbolizing Themes
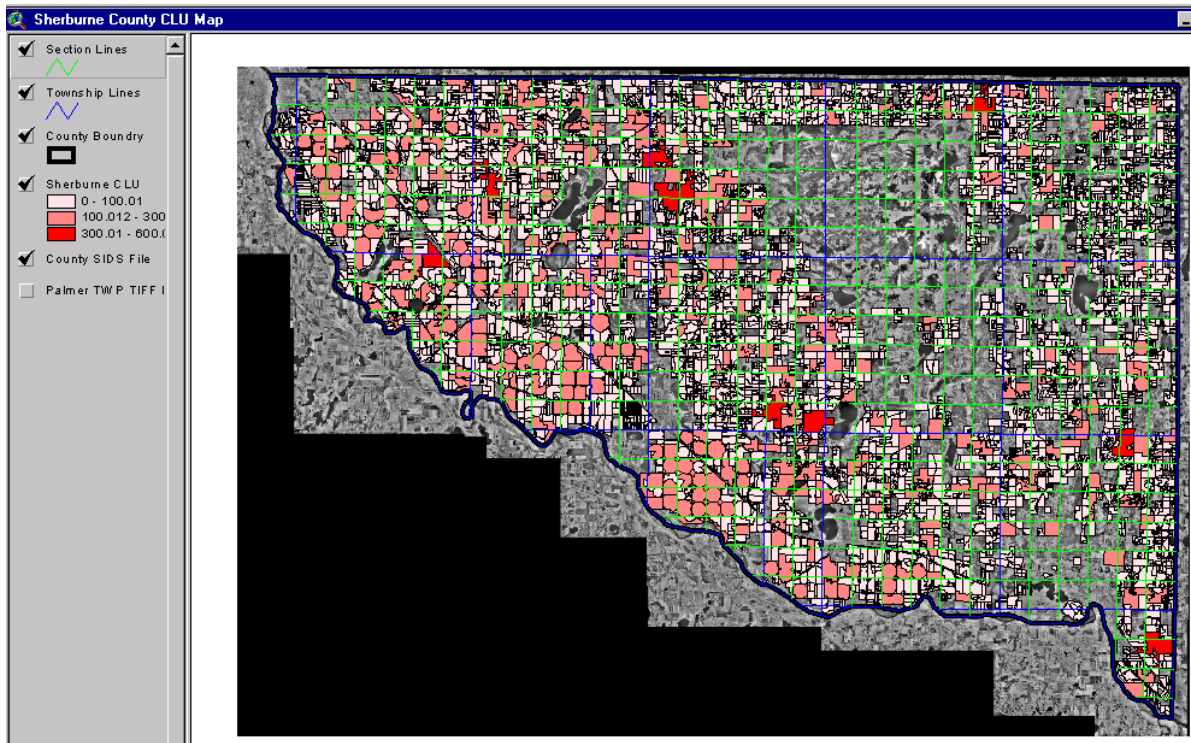
10) Click the Save Project button to save your project!

11) Use the legend editor and palette manager to classify and symbolize the remaining themes as follows:

Section Lines - Single Symbol Legend. Make the lines solid, green in color, with a thickness of one.

Township Lines - Single Symbol Legend. Make the lines solid, blue in color, with a thickness of one.

County Boundary - Single Symbol Legend. Make the lines solid, black in color, with a thickness of 3.

12) Turn on all the themes. Close the View window, save your project and Quit ArcView.

Exercise 4 - Classifying and Symbolizing Themes

Notes and Comments.

Exercise 5 - The Table Document

Attributes of Sherbclu.shp

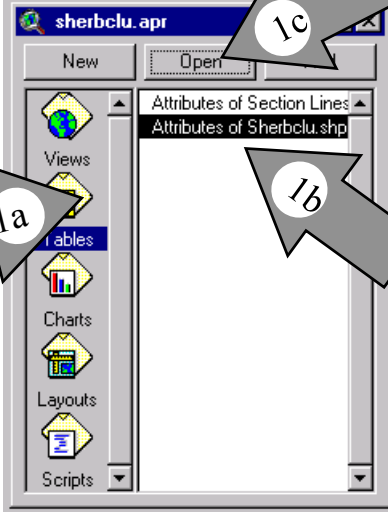| Shape	Statefips	Countyfips	Tract	Fam	Clunumber	Calcacres	He	Uid	Comments
Polygon	27	141	1681	1170	2	3.09	N		
Polygon	27	141	1681	1170	1	4.38	N		
Polygon	27	141	1682	2533	0	1.43			
Polygon	27	141	1682	2533	0	1.97			
Polygon	27	141	1682	2533	1	77.09	N		
Polygon	27	141	6790	2318	0	34.79			
Polygon	27	141	6791	2793	2	2.22	N		
Polygon	27	141	6791	2793	0	18.29			
Polygon	27	141	6791	2793	1	0.73	N		
Polygon	27	141	6792	2794	1	10.02	N		
Polygon	27	141	6672	2195	2	1.84	N		
Polygon	27	141	6672	2195	0	65.43			
Polygon	27	141	6672	2195	1	8.22	N		
Polygon	27	141	1686	1214	0	39.95			
Polygon	27	141	1687	1188	0	60.21			
Polygon	27	141	1687	1188	1	8.50			
Polygon	27	141	1687	1188	2	9.13			
Polygon	27	141	1685	1309	4	6.87	N		

INTRODUCTION

As you have seen, geographic data sets (GIS data) have a spatial component, a map, and a tabular component (the attribute table). In exercise three, you opened a theme attribute table and had a quick look. In this exercise we will go into the Table document in more detail, learning some of the basics of table management.

If ArcView is not already running, start it now and open the ArcView project that you have been working on to this point, sherbclu.apr

You learned that there are two classes of tables that ArcView can manage, "Theme Attribute Tables" and stand alone "Data Tables". The things you can do with tables do not differ between the two. The difference is that theme attribute tables are linked to geographic data while stand alone data tables are not.
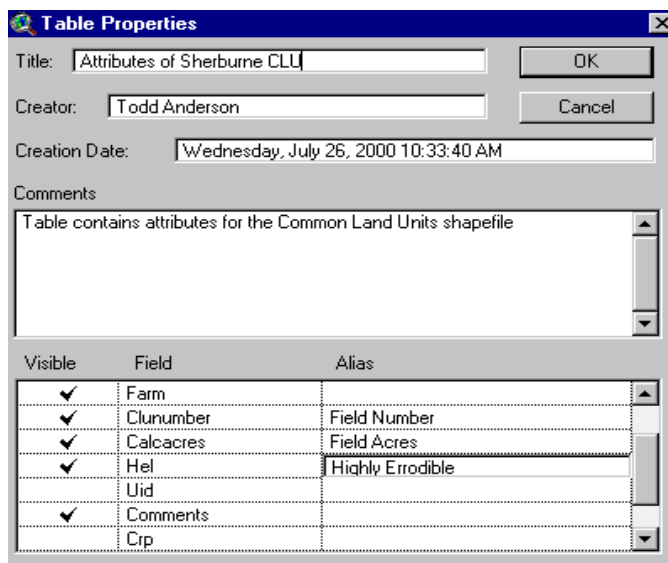
Exercise 5 - The Table Document

1) Let's start this exercise by opening the table that was added in Exercise 2, "Attributes of sherbclu.shp". Make the Table Folder active in the Project Window (1a). Make sure the "*Attributes of sherbclu.shp* " is active (1b) and then press the OPEN button (1c). The table will appear (1d). As you know from lesson 2, this table contains a variety of information related to the polygons that represent common land units. Things like tract, farm, clu number, calculated acres, etc..

Exercise 5 - The Table Document
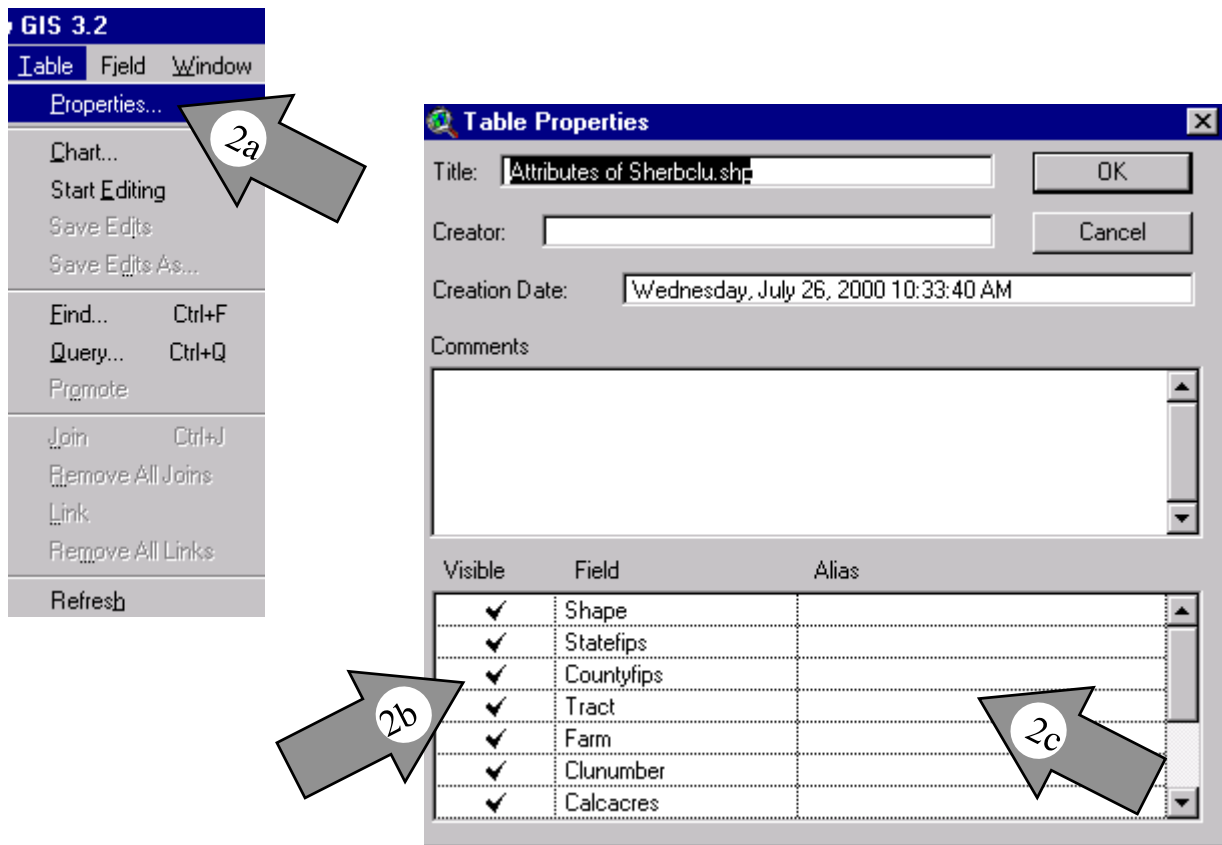
2) As usual, we want to set the properties of this document. To bring up the property sheet for the table use the TABLE menu Properties option (2a). The property sheet for a table allows you to set the familiar name, make comments, choose fields to be displayed in the document, and any "Aliases" or alternate field names. At the bottom of the Property sheet is a window that displays the Fields and field properties. To turn off item display, click the Check for that particular item(2b). To create an alias, simply type in an alternate name which can contain spaces and special characters (2c).

Exercise 5 - The Table Document

3) Set the properties of the table as follows.

Displayed	Field Name	Field Alias
no	Shape	
yes	Statefips	State Code
yes	Countyfips	County Code
yes	Tract	
yes	Farm	
yes	Clunumber	Field Number
yes	Calcacres	Field Acres
yes	Hel	Highly Erodible
no	UID	
no	CRP	
no	Contract_Number	
no	Expiration_Date	
no	CRP_Cover_Practice	
yes	Comments	

The name of the table seems OK so let's leave that alone. Change the comments to reflect what the table is being used for. The property sheet should look similar to the one that is displayed above. Once complete, close the property sheet using the OK button. Examine the table noting the changes that you made.

Exercise 5 - The Table Document
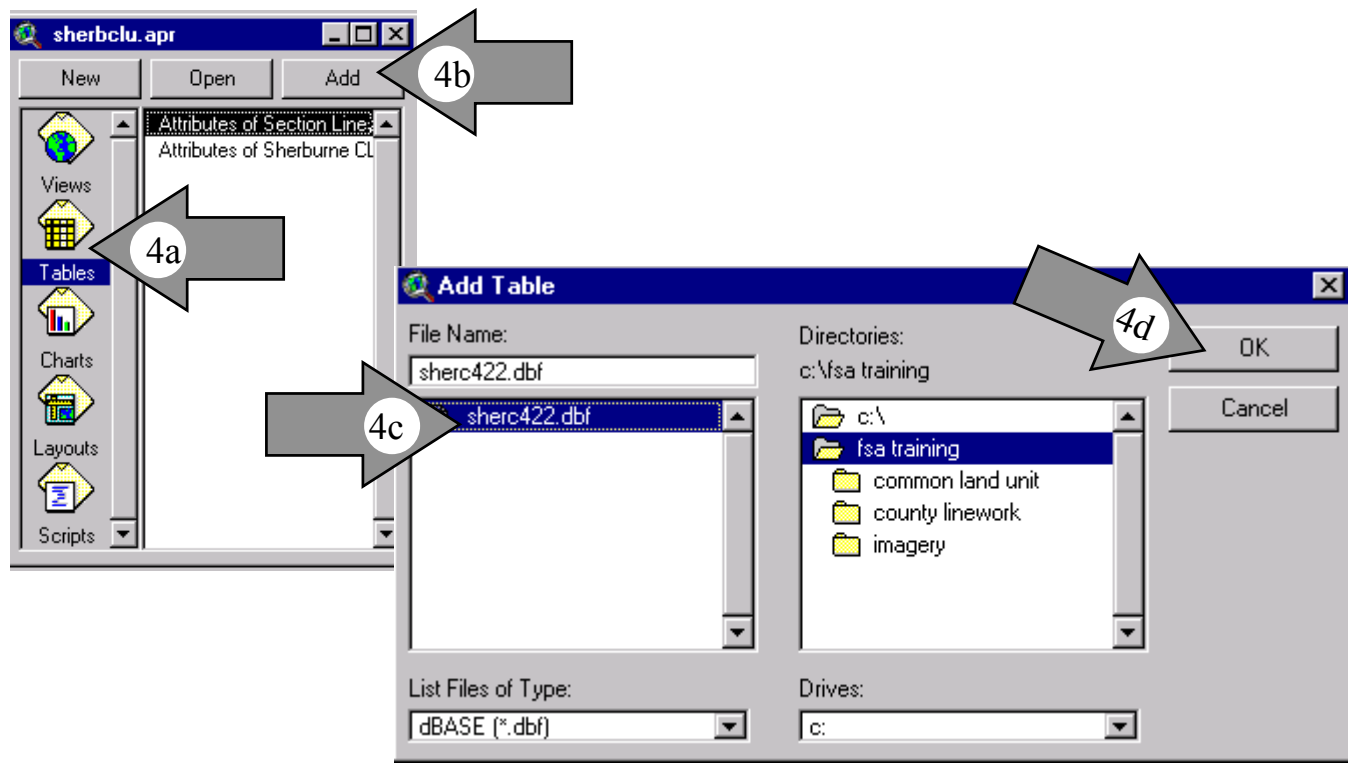
4) Now play, I mean, work with the table. You can highlight items by clicking the field name. Once highlighted this is the active item. You can also change the order of the items by Clicking and dragging the item from it's current position to another position. Try it, you can't hurt anything.

  Now let's open a stand-alone data table. Make the Project Window active and make the Table Folder active (4a) . Then use the ADD button to bring up the Add Table dialog box (4b). We are looking for a file called sherbc422.dbf. This is a DBASE format file that contains a variety of CRP information related to the common land units of Sherburne County. Highlight the file (4c) and press the OK button to open the table document and dismiss the dialog box (4d). A new Table document will be added to the project, by default, it's name is the filename.

Exercise 5 - The Table Document
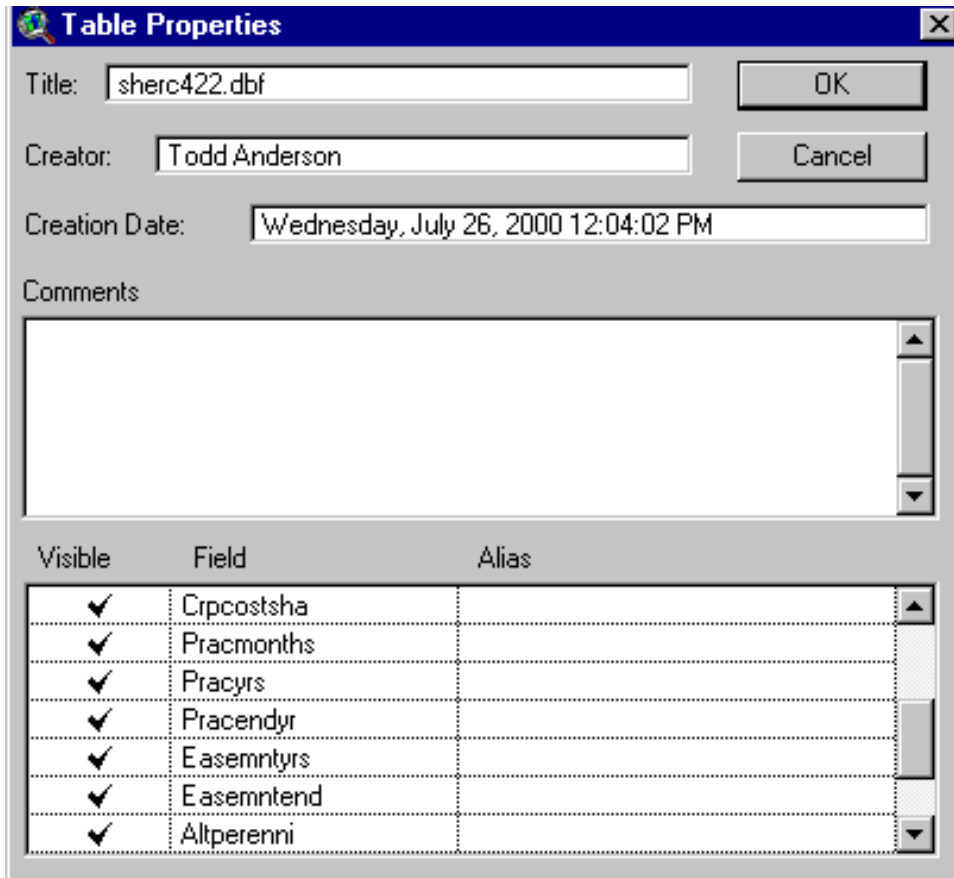
5) Again, use the property sheet of the Table sherc422.dbf to modify the alias and comments related to this Table. Change and names and turn fields on or off if you feel like it..

6) Now, Save your project and exit ArcView.

Exercise 5 - The Table Document

Notes and Comments.

Exercise 6 - Working with Tables
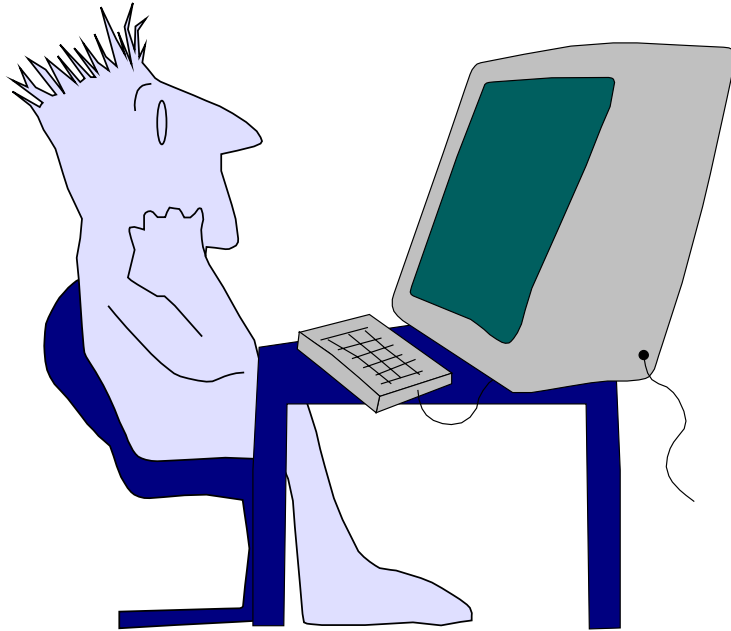
INTRODUCTION

Tables are for more than just display and query, they can be used to create
  summaries and statistics for a variety of purposes. Some examples are
  reports, management plans, and decision making. The key is in
  "mining" the data to produce Information. While not a statistical
  package, ArcView has some basic summary and statistical operation.

In addition, we may want to modify data that exists in a table. Fixing
  attribute errors and adding new fields to tables are things you can do
  in ArcView.

1) Make sure that ArcView is loaded and running. If not, start the program.

2) Load the project we have been working with, sherbclu.apr. It's in the
  same shape as it was when we saved the project in the previous
  exercise.

Exercise 6 - Working with Tables
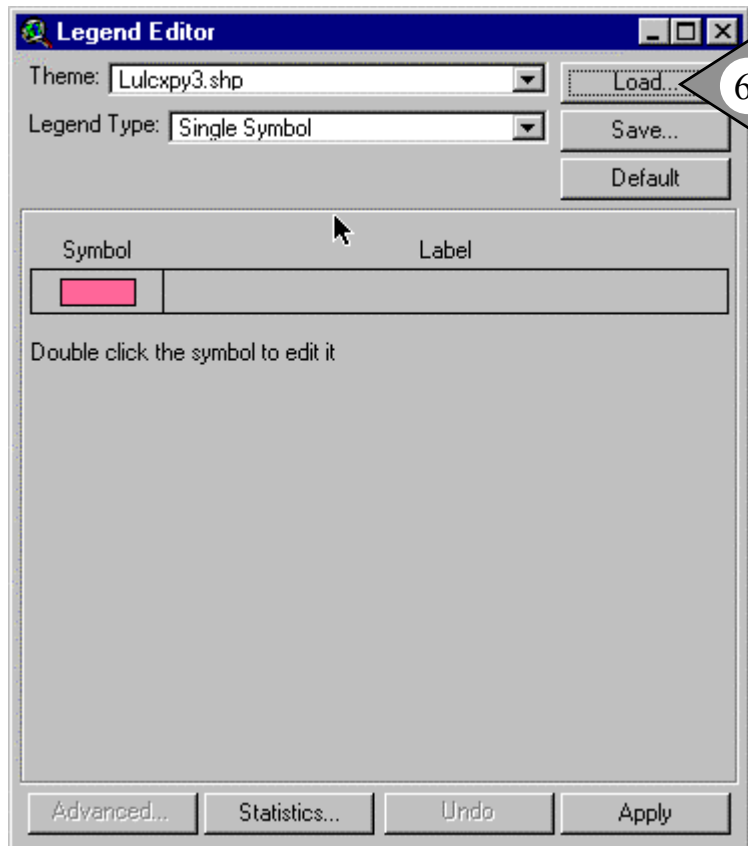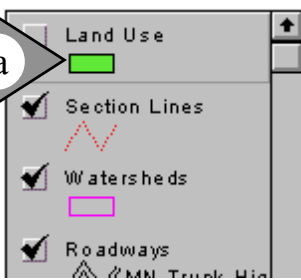
3) Open the View, "Pope County Data"

4) Add a Feature based theme called LULCXPY3.SHP. This is an ArcView shapefile that contains land use polygons for the county. This is a complex coverage that has lots of detailed polygons representing land use patterns circa 1990.

5) Update the Property sheet for this theme. Change the name to **LAND USE** and set the comments to:
"*Land use in Pope County collected from air photos circa 1990 at a scale of 1:24,000*"

Press the OK button to apply and close the Property Sheet.

6) We will use an existing ArcView legend to classify and symbolize this theme. To do this, open the Legend Editor for the "Land Use" theme (6a), then load the existing legend by pressing the LOAD button (6b).

Exercise 6 - Working with Tables
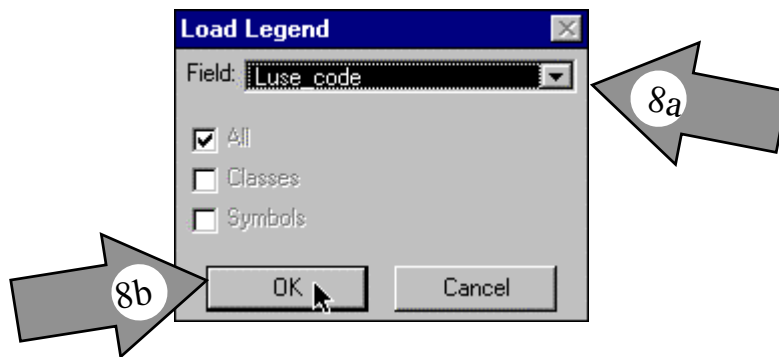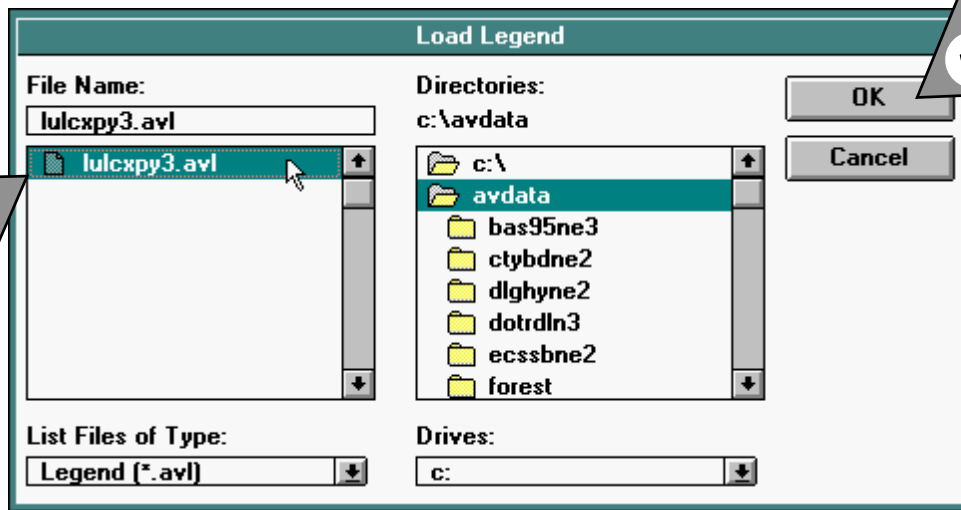
7) To load the existing legend LULCXPY3.AVL you need to select the legend using the mouse (7a) and then press the OK button to load the legend (7b).

8) ArcView needs to know what field was used to create the legend. In this case, we want to use the field Luse_Code (8a). Select it and load the legend by clicking the OK button (8b).

8) Click APPLY in the Legend Editor to make the changes to the theme in the Table of Contents. Then close the Legend Editor.

Exercise 6 - Working with Tables
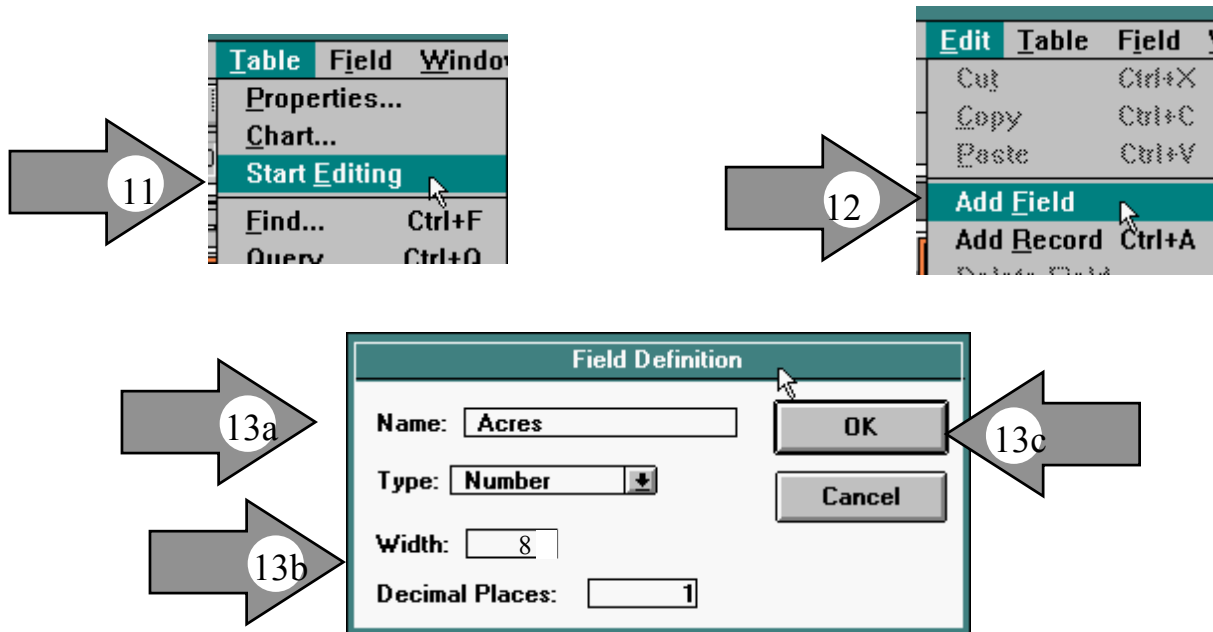
9) Now open the Theme Attribute Table for the "Land Use" theme by pressing the OPEN TABLE button or using the **THEME** menu, *Table* option. Make sure the "Land Use" theme is active.

10) We want to generate a summary of land use by area. Problem is that the AREA field expresses area in terms of square meters. Not good. We want the area to be expressed in ACRES. To do this we will add a field called ACRES to the attribute table and calculate it's area in acres.

11) Use the **TABLE** menu, *Start Editing* option (11). The table is now ready to be edited.

12) Add the field called ACRES to the table. Do this by using the **EDIT** menu, *Add Field* option (12) . This will display the Add Field dialog box.

13) Name the field ACRES (13a). Make it a number with a width of 16 and the number of decimals 1 (13b). Press OK to add the new field (13c).

Exercise 6 - Working with Tables
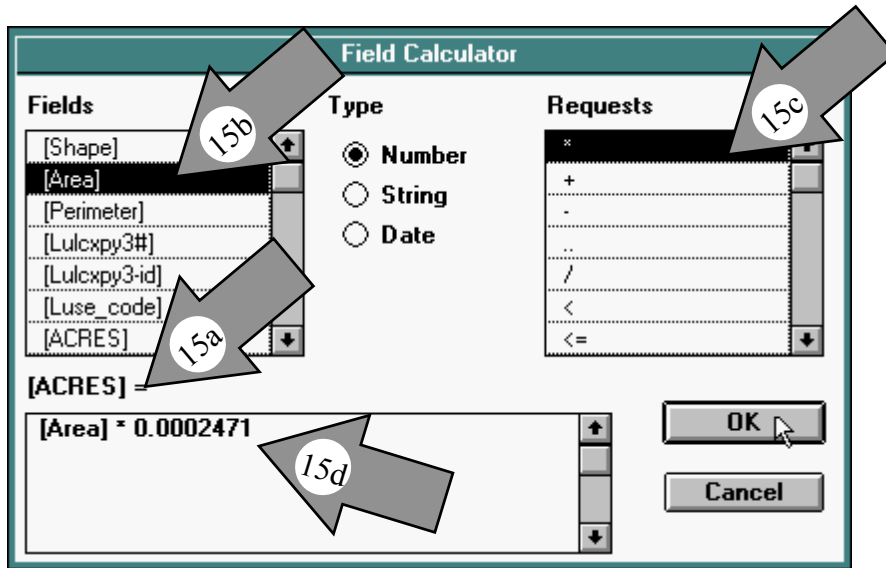
14) The field ACRES is now part of the table. It's at the far right side of the table. The field will be highlighted so we are ready to go.

15) We want to calculate the value of this field to be the acreage of the polygon. Use the Field Calculator. The calculator is accessed using the **FIELD** menu, *Calculate* option. A dialog box will appear with the fields in the left window and the mathematical operators in the right window.

Notice that the string [ACRES] = (15a). We want to fill in the rest of the story. In this case, the existing field is called AREA and it stores the area of a polygon in square meters. To convert from square meters to acres we need to multiply (*) the value of AREA by 0.0002471. To do this, double click on the item AREA in the left window (15b), then click on the multiplication * in the right window, (15c) then type 0.0002471 in the formula window (15d).

Press the OK button and ArcView will fill in the new field with acreage values!

Exercise 6 - Working with Tables
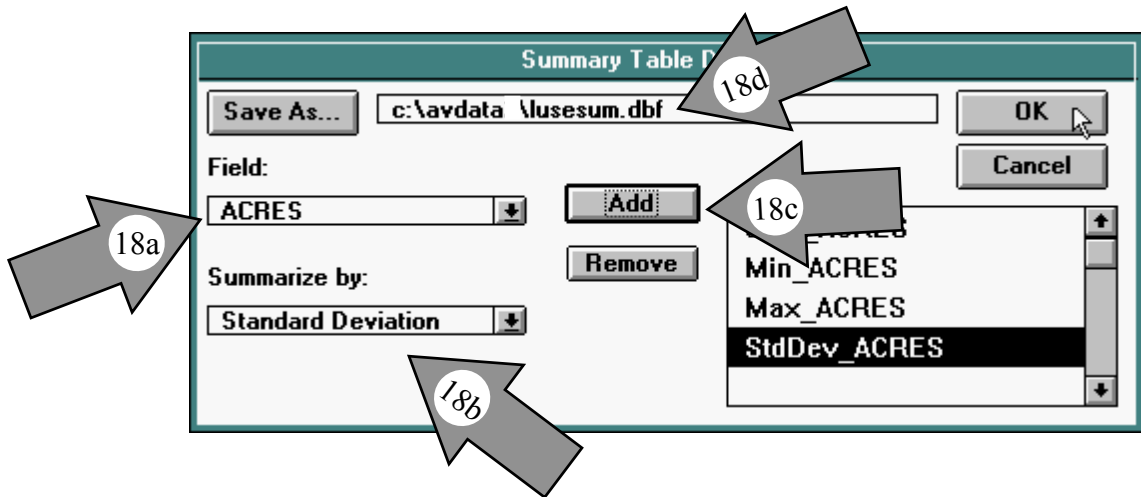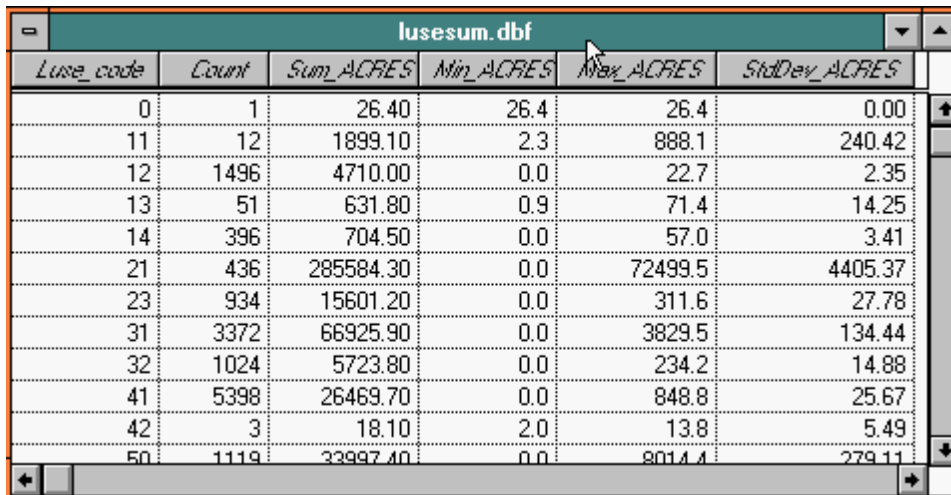
16) Now, use the **TABLE** menu, *Stop Editing* option to save the edits
    and quit editing the table.

17) Now we can generate our summary table that displays Land Use
    Classes by Acreage. To do this we need to highlight the field
    LUSE_CODE and then access the Summarize Dialog Box using the
    FIELD menu, *Summarize* option.

18) To perform our summary we need to make ACRES the summary
    field (18a) and then select the types of statistical summaries we
    want to create.

    Let's create a summary that contains the Total Acres, minimum,
    maximum, and standard deviation of the polygon size for each land
    use class. Do this by highlighting the SUM, MINIMUM,
    MAXIMUM, and STANDARD DEVIATION summaries (18b) and
    then pressing the ADD button to add the field to the new output
    table (18c).

    Now, change the name of the new table (18d) and press the OK
    button to build the summary.

Exercise 6 - Working with Tables

Luse_code	Count	Sum_ACRES	Min_ACRES	Max_ACRES	StdDev_ACRES
0	1	26.40	26.4	26.4	0.00
11	12	1899.10	2.3	888.1	240.42
12	1496	4710.00	0.0	22.7	2.35
13	51	631.80	0.9	71.4	14.25
14	396	704.50	0.0	57.0	3.41
21	436	285584.30	0.0	72499.5	4405.37
23	934	15601.20	0.0	311.6	27.78
31	3372	66925.90	0.0	3829.5	134.44
32	1024	5723.80	0.0	234.2	14.88
41	5398	26469.70	0.0	848.8	25.67
42	3	18.10	2.0	13.8	5.49
50	1119	33997.40	0.0	8014.4	279.11

lusesum.dbf

19) You now have a new DBASE format table that stores the summaries that you requested along with another field COUNT that records the number of polygons for each of the land use classes.

20) Before we close this lesson, try sorting the data on the SUM_ACRES field. To find out how, use the HELP system and search on "Sorting a Table".

21) Now close all the documents in your project, save the project and exit ArcView.

Exercise 6 - Working with Tables

Notes and Comments.

How many?

How much?

<u>Where are they?</u>

What's the total number of ?

INTRODUCTION

Queries are designed to allow the user to subset, or filter, data sets to mine information from the data. ArcView has the ability to perform two specific types of queries, Tabular and Spatial. In this exercise, we will do a couple of tabular queries and leave the spatial queries until next exercise.

If ArcView is not up and running make it so. Then open the existing project that we have been working on, sherbclu.apr.

1) Attribute queries are performed on stand alone data or Theme Attribute tables. Because of this, queries can be initiated from both the View document and the Table document. In this case we want to query a theme attribute table so that we can show the results of our query on the View display.

The Query Dialog Box is a window that allows you to specify queries. It is accessed using the **TABLE** or **THEME** menu, *Query* option.

Exercise 7 - Querying Themes and Tables
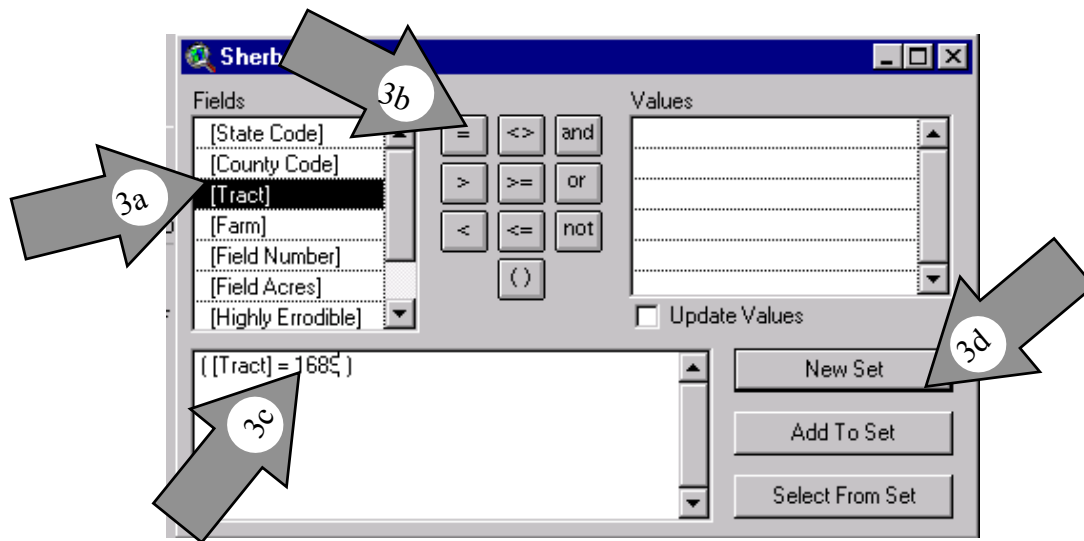
2) Before we can do this we need to have an open View document with an active Theme. Let's perform our query on the Sherburne CLU Theme, trying to find those polygons that are identified as Tract 1689.

Open the "Sherburne County CLU" View and then make the "Sherburne CLU" theme active. Then activate the Query builder using the **THEME** menu, *Query* option.

3) Construct the query in the following fashion:
   a) Double click on the item Tract
   b) Single click on the =
   c) Enter in the value 1689 (make sure you have parenthesis)
   d) We want to create a new working set so press the New Set button to initiate the query. Then dismiss the Query Dialog box.
   E) Repeat the above steps using the Farm Number 1441.

4) There are many different queries you can do. Take some time to experiment with querying out more than one item or adding to or selecting from a set. If you are having trouble, use the help menu.

Exercise 7 - Querying Themes and Tables

5) You have just completed your first query. Now look at the View. Notice the polygons with farm number 1441 are colored in yellow, the default highlight color.

Open the Theme Attribute Table for the Land Use theme. Use the OPEN TABLE button (5a). Notice that there are a number of records selected and highlighted in yellow. If you look in the left portion of the Tool menu, you will see a listing of the number of selected records out of the total number of records in the table (5b).

Right now the selected records are scattered throughout the table. You can push, or promote, all of the selected records to the top. Why don't you use the HELP system to find out how do this, searching on the key word, PROMOTE.

Exercise 7 - Querying Themes and Tables
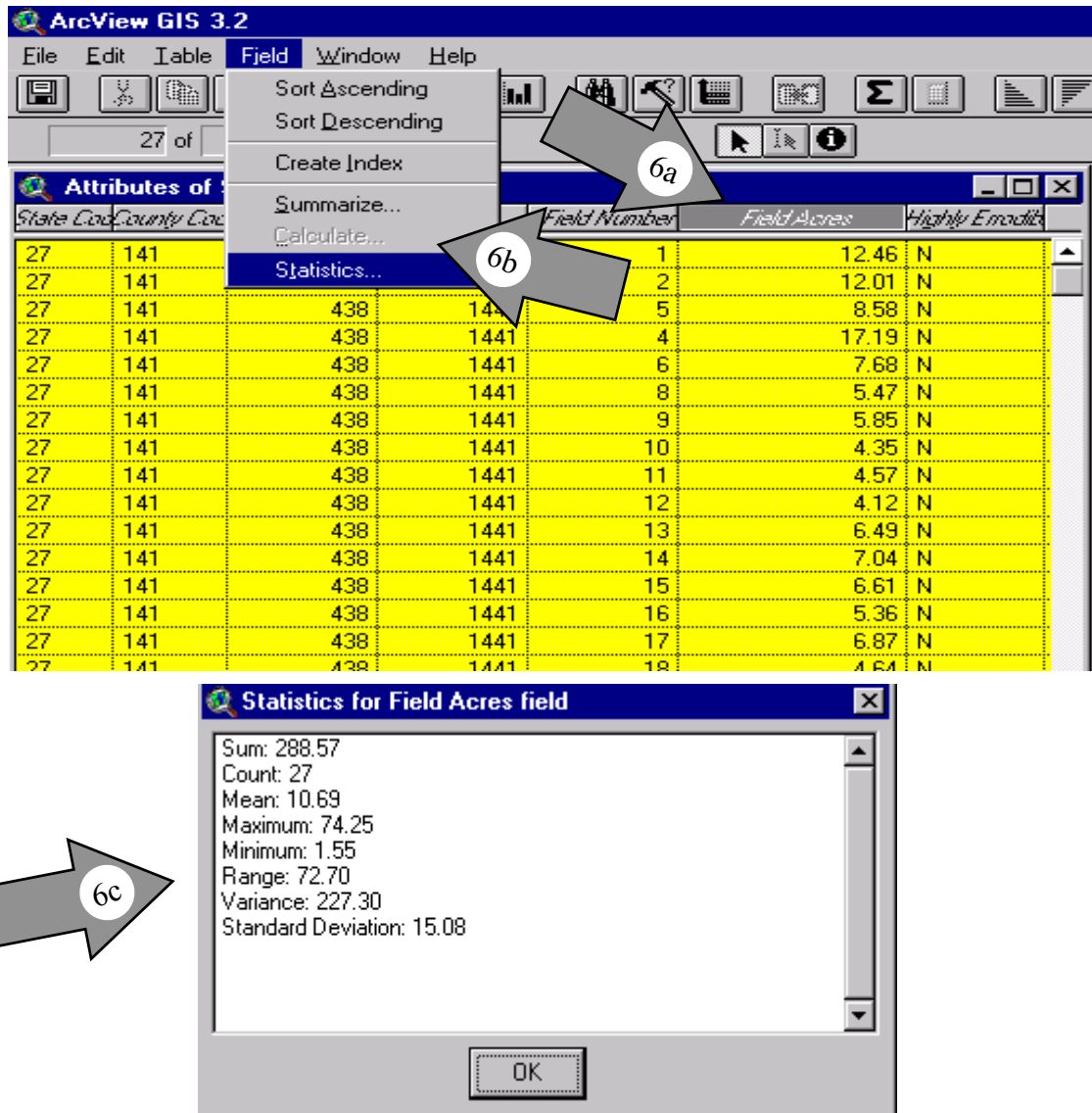
6) One of the more interesting functions of ArcView is that any operation performed (like statistics and summaries) is done for only the selected set of features (or records). Say we wanted to know the total acreage of farm 1441. All the records are already highlighted so we make the Field Acres field active (6a) and then use the **FIELD** menu, *Statistics* option (6b). After a couple of seconds, ArcView will display a window with the field statistics displayed (6c)

7) We are done with this exercise. Close all of the documents and save the project. Then exit ArcView.

Exercise 7 - Querying Themes and Tables

Notes and Comments.
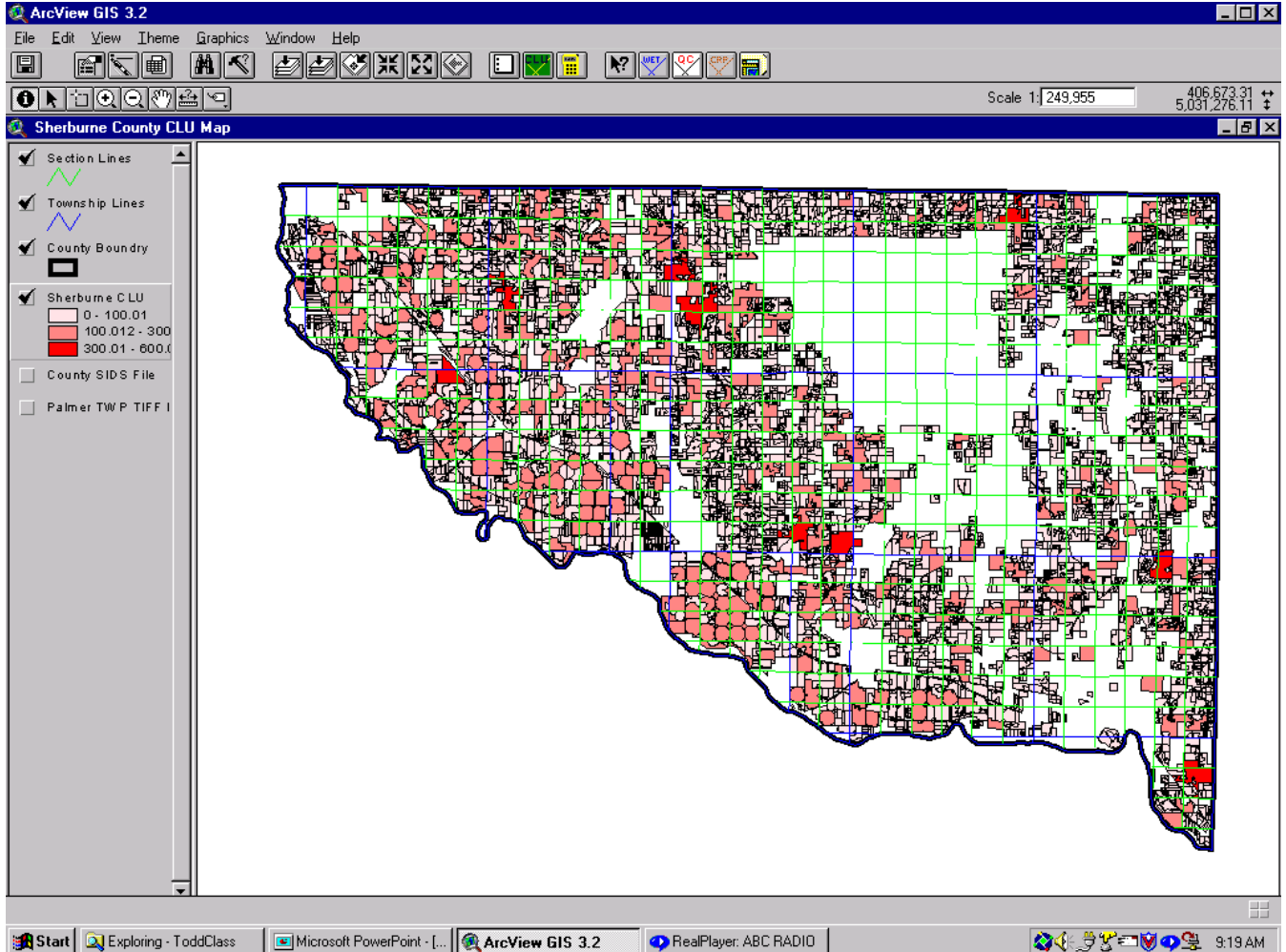
Exercise 8 - Spatial Queries

INTRODUCTION

Spatial queries are part of the backbone of geographic analysis that GIS software provides. ArcView has the capability to perform a variety of types of spatial queries. There are some limitations however, some of which you really need to know about. In this exercise you will be introduced to a couple of spatial query operations and what to watch out for.

We'll start out this exercise with a hypothetical problem. Suppose townships started their own farm payments and if your field was on township lines the farmer would be eligible in both townships. You need to query out any fields that would qualify for this dual township payment.

Exercise 8 - Spatial Queries

1) Start ArcView if it's not already started and open the class project, sherbclu.apr. Then open the View, "Sherburne County CLU Map", turn on the "Sherburne CLU" Theme and make it active. You will be making two queries now.

Exercise 8 - Spatial Queries
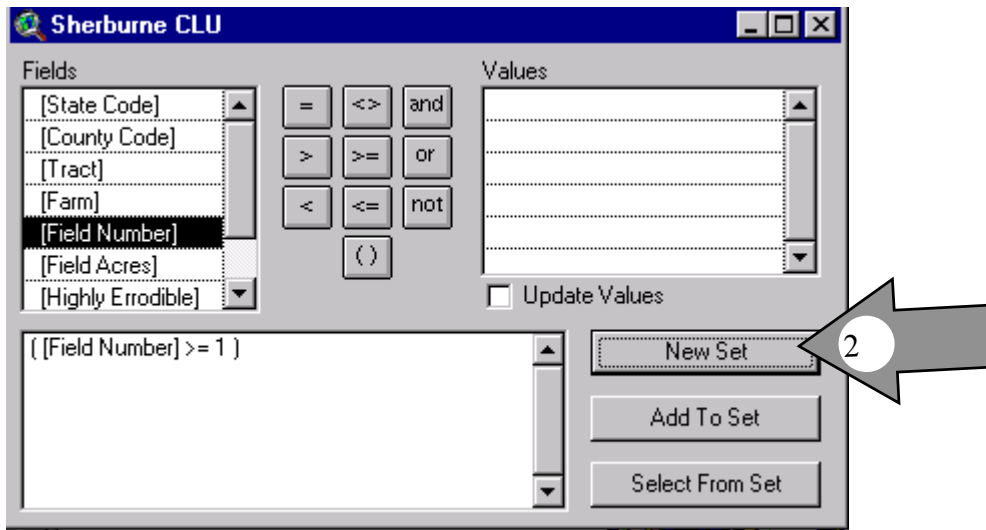
2) This type of query has a spatial component and a tabular component. The spatial part is "intersect", the attribute part is Township Lines

We'll start our query by selecting those polygons that are fields which have a field number of 1 or greater. Do the query by accessing the Query Builder from the **THEME** menu, *Query* option. The query we want to enter is:

   ([Field Number] >= 1)

Enter the query and press the *New Set* button (2) to apply the query, then dismiss the query builder.

That was an Attribute Query.

Exercise 8 - Spatial Queries

3) Now the spatial query part. The way spatial queries are performed in ArcView is based on Theme on Theme overlay. Another way to express this is that we want to select features from the active Theme that spatially relate to selected features in another Theme.

4) Before moving on to the next step, save your project using the *Save* button.

In our case we only have one Theme of interest, "Sherburne CLU". To execute the query we first need to make sure that the theme is active and then access the Spatial Query Dialog using the **THEME** menu, *Select By Theme* option (4).

Exercise 8 - Spatial Queries
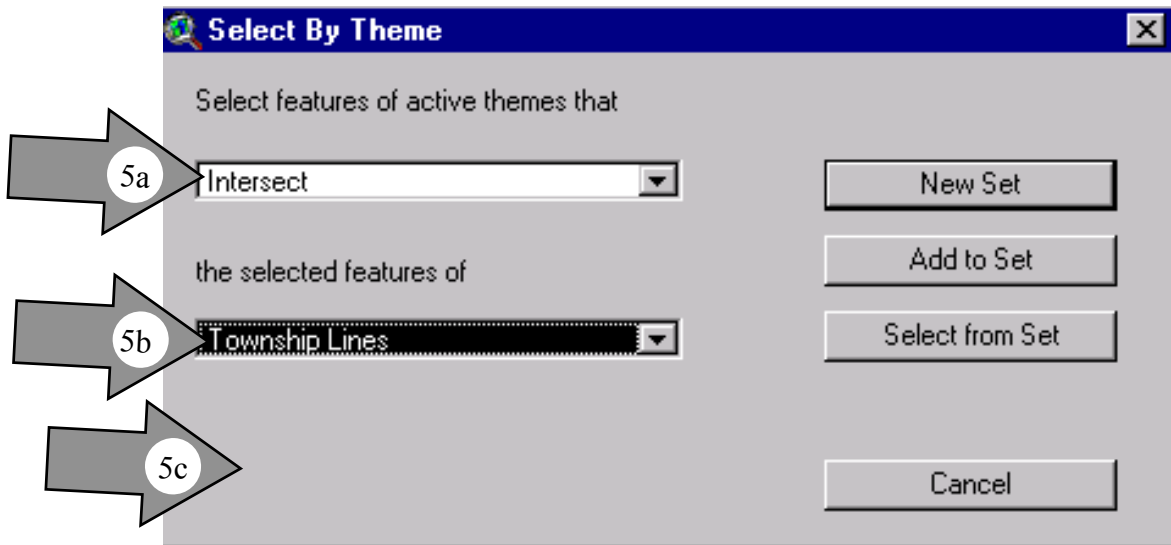
5) Look at the *Select By Theme* dialog. Change the query type to "Intersect" (5a) the selector theme to "Township Lines" (5b) (some selections require a distance entry which would be located by the 5c arrow.

Since the "Sherburne CLU" Theme is active what this query says is: Find all polygons (with field numbers greater than or equal to 1) in the theme "Sherburne CLU" that intersect with the line in the theme Township Lines.

Press the *New Set* button to generate the query. **BE PREPARED! THIS MAY TAKE SOME TIME TO PROCESS!!!!**

When it is complete, the View will be refreshed and all field polygons that intersect township lines will be selected and highlighted.

What has happened is that you have selected all polygons that have all or part of their borders intersecting township lines. That means that the whole polygon gets selected.

Exercise 8 - Spatial Queries
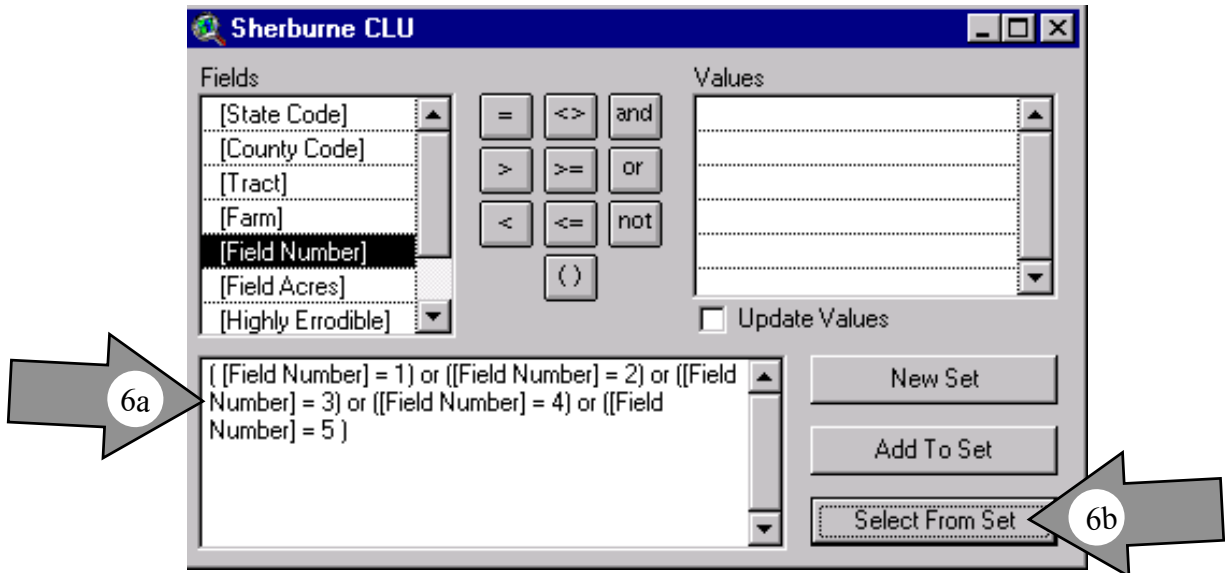
6) But we're not done yet. Let's say that fields only qualify for this program if their Field Number is 1 through 5.

To get these polygons we need to do another attribute query. You know how to do this. Access the Query Builder by pressing the **THEME** menu, *Query* option.

Then enter the following query string (6a):

([Field Number] = 1) or ([Field Number] = 2) or ([Field Number] = 3) or ([Field Number] = 4) or ([Field Number] = 5)

Because we want all polygons selected that are next to township lines we need to use the *Select from Set* button to get the job done (6b).

Exercise 8 - Spatial Queries
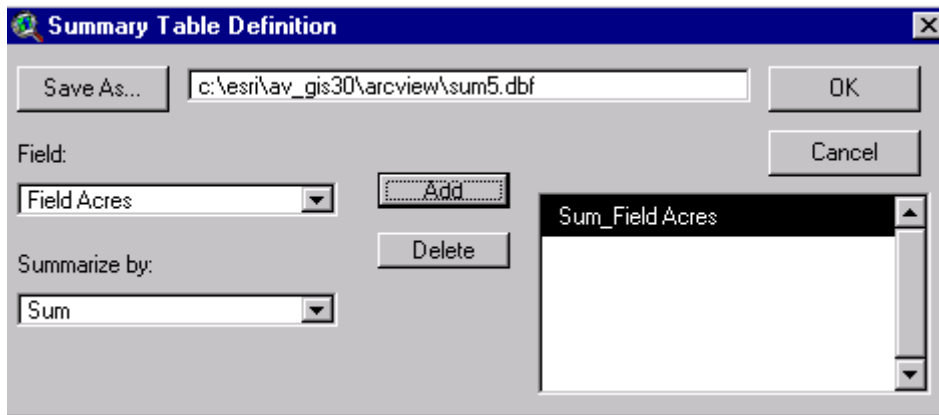
7) Now look at your View. What you see is what you get! This is really good stuff but as you can see, it takes some time for ArcView to generate this type of a query.

Now you are ready to generate the summary report that give an idea of how many acres qualify for the dual payment. We want to summarize the fields by summing the acres. To do this we need to first open the "Sherburne CLU" Theme attribute table.

Make the Field Number field active and then press the **FIELD** menu, *Summarize* option.

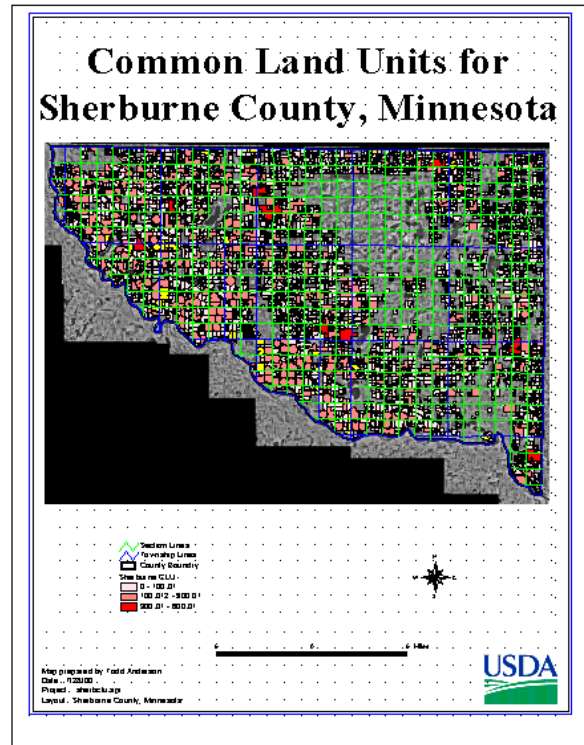Then fill in the blanks to look like the above example.

You could print this table using the **FILE** menu, *Print* option.

8) Now save your project and exit ArcView.

Exercise 8 - Spatial Queries

Notes and Comments.

Exercise 9 - Constructing a Layout

Introduction

As you know, one of the exciting aspects of GIS is the ability to perform analysis and then produce hard-copy maps of the results. In the previous exercise we conducted an analysis and produced a summary table of the results.

We will, no doubt, be creating many maps in the future. One which may be a map of the county showing the CLU, township lines, section lines, county boundaries, and imagery. We will create a standard format (8.5 x 11 inches), portrait, color product. In addition to the map, we want to place a legend, north arrow, scale bar, title, comments, and a USDA Logo.

If ArcView is not up and running make it so. Then open the existing project that we have been working on, sherbclu.apr.

Exercise 9 - Constructing a Layout
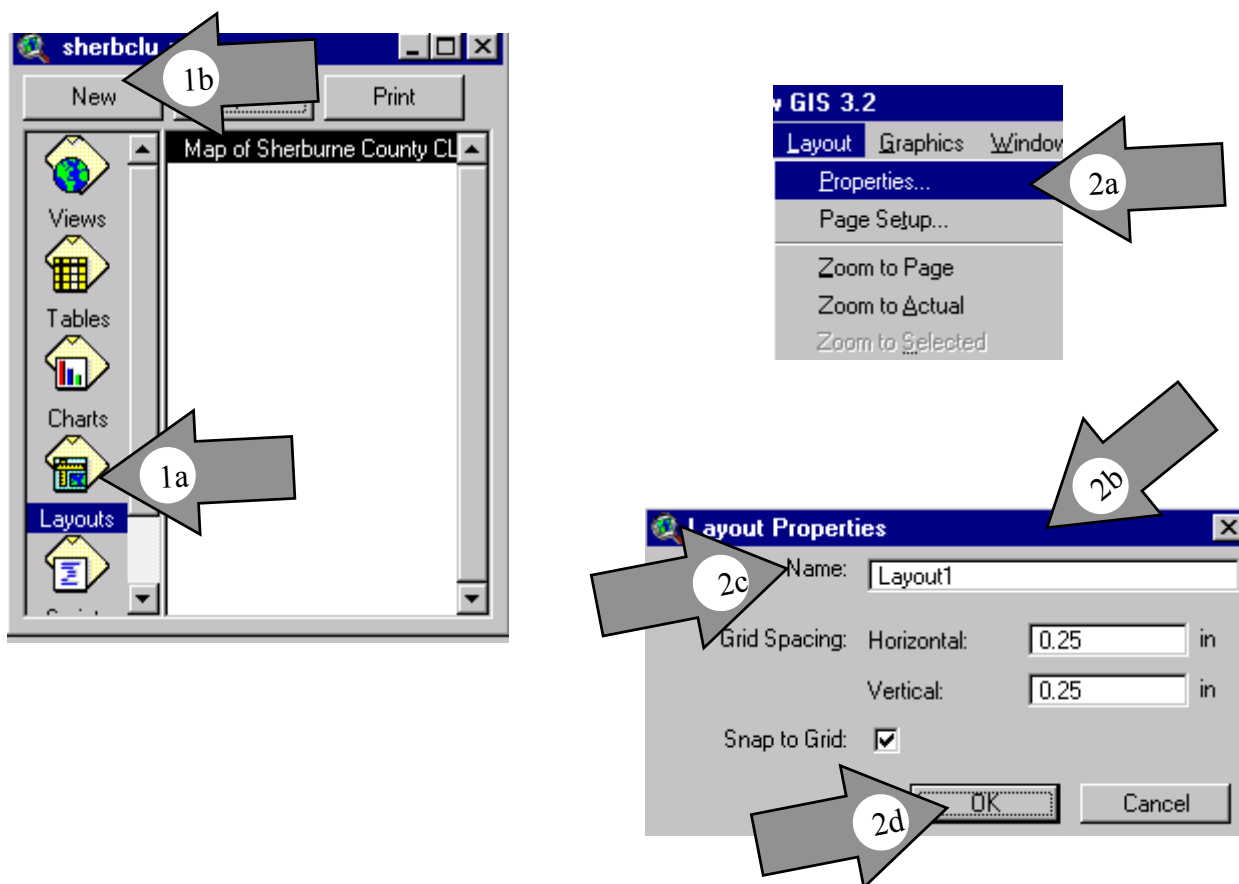
1) We want to create a layout so start there. Make sure that the Layout folder is active in the Project window (1a) and then press the NEW button (1b) or double-click on the folder.

   A new layout will appear.

2) Layouts have properties so access the Layout's property sheet using the **LAYOUT** menu *Properties* option (2a). The Layout Property sheet will appear (2b).

   Modify the property sheet and change the name (2c). Everything else should be fine. Press the OK button to apply and dismiss the property sheet (2d). (I usually turn off the Snap to Grid for easier mobility.)

Exercise 9 - Constructing a Layout
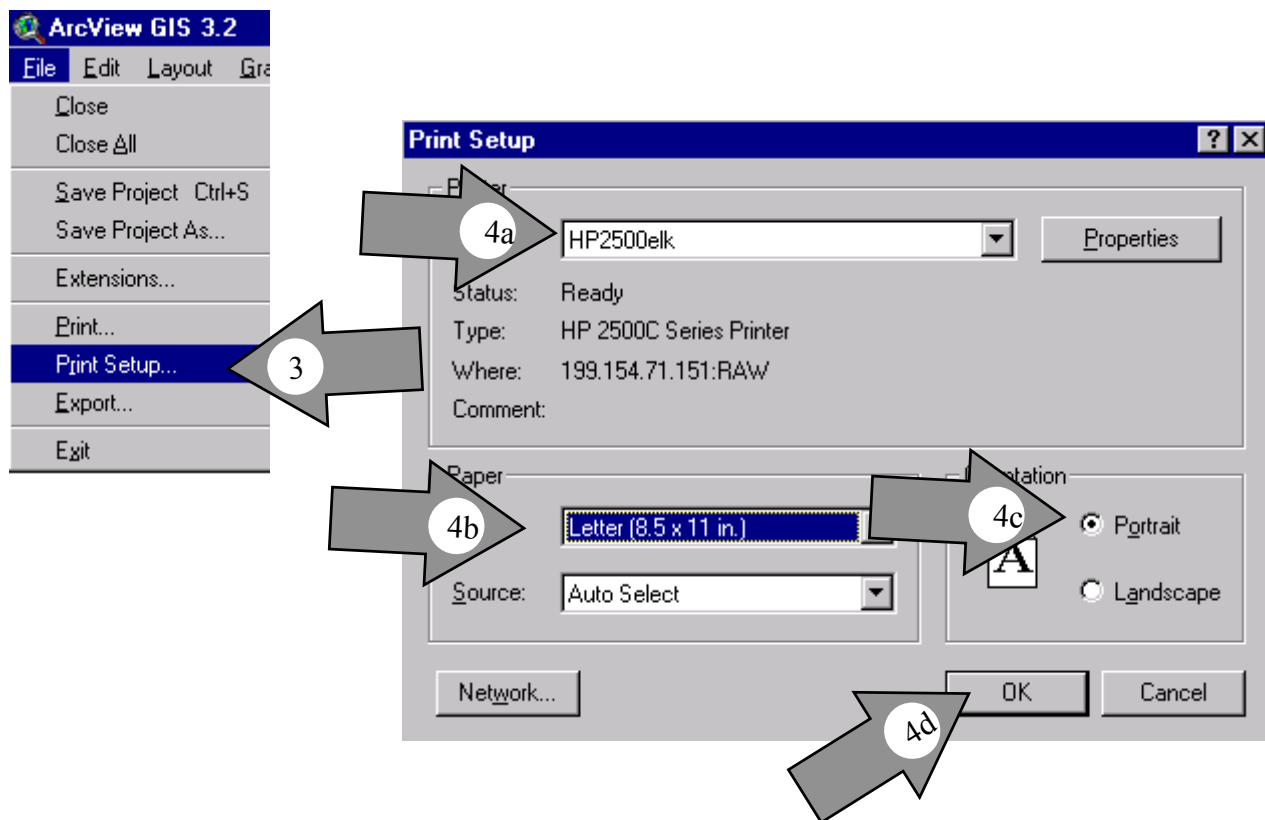
3) Before we do anything else, we need to set-up the printer we will be using for this layout. Do this by using the **FILE** menu *Print Setup* option (3)

4) The print setup sheet will then be displayed. Change the following printer characteristics:
   a) Printer name to the *HP2500(part of county or city name)*
   b) Paper Size choose Letter 8.5x11
   c) Orientation to *Portrait*

Once finished, press OK to apply and close the Print setup sheet (4d).

Exercise 9 - Constructing a Layout

5b -0.73 in ↔
      11.18 in ↕

Sherburne County, Minnesota

5a
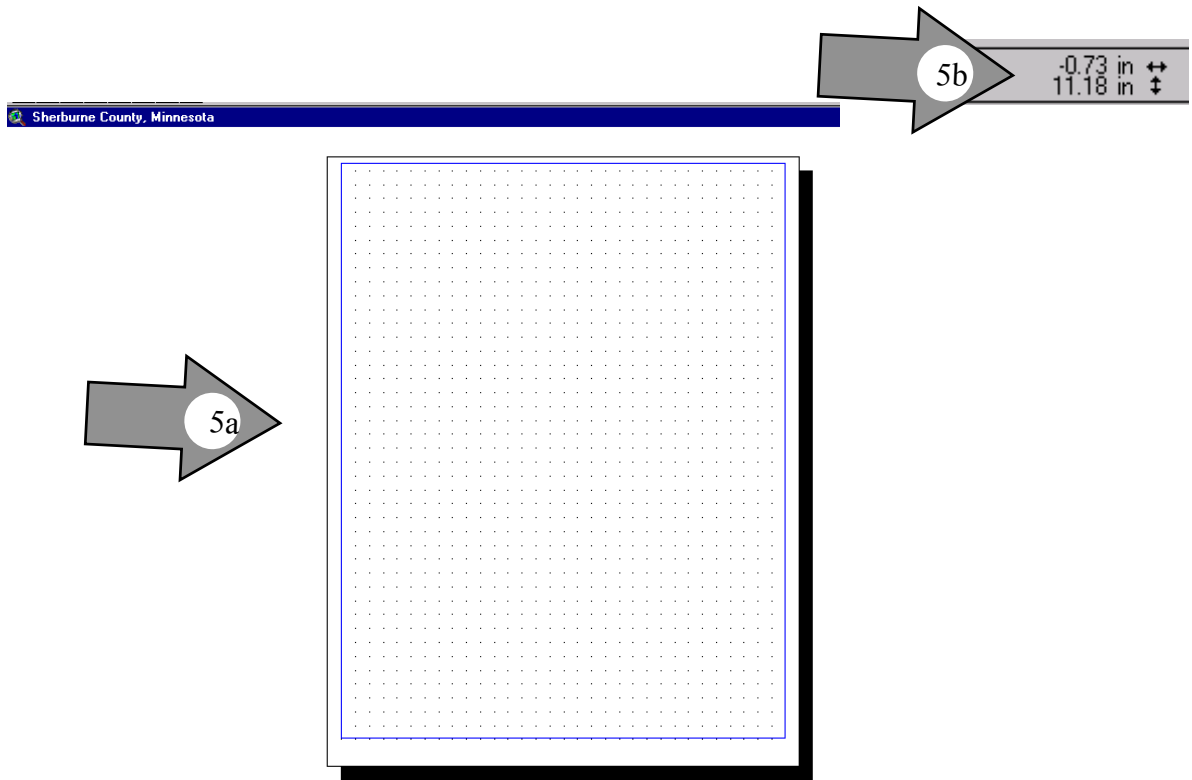
5) Before moving on, maximize the Layout document and then use the Zoom to Page button to display the entire sheet of paper in the Layout document window. Use the HELP system to find out how to do this if you don't already know how.

Now you can see a piece of paper, 11 inches tall and 8.5 inches wide (5a). Notice the interface change. Move the cursor over the layout and note the numbers that appear in the right hand portion of the Tool bar. The coordinates displayed are in "Page Coordinates" (5b)

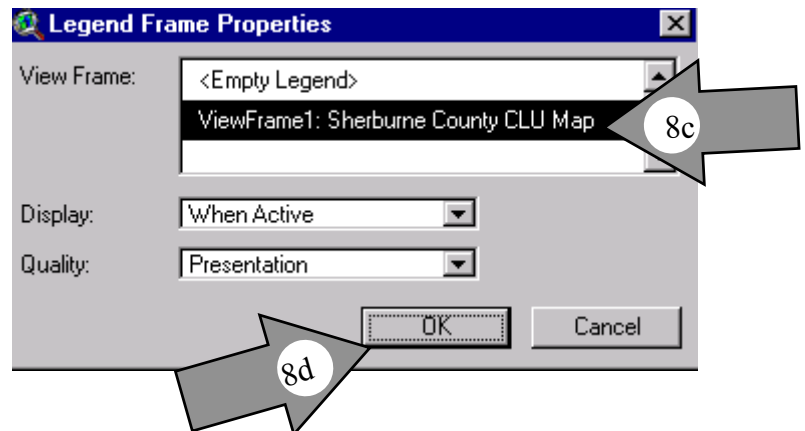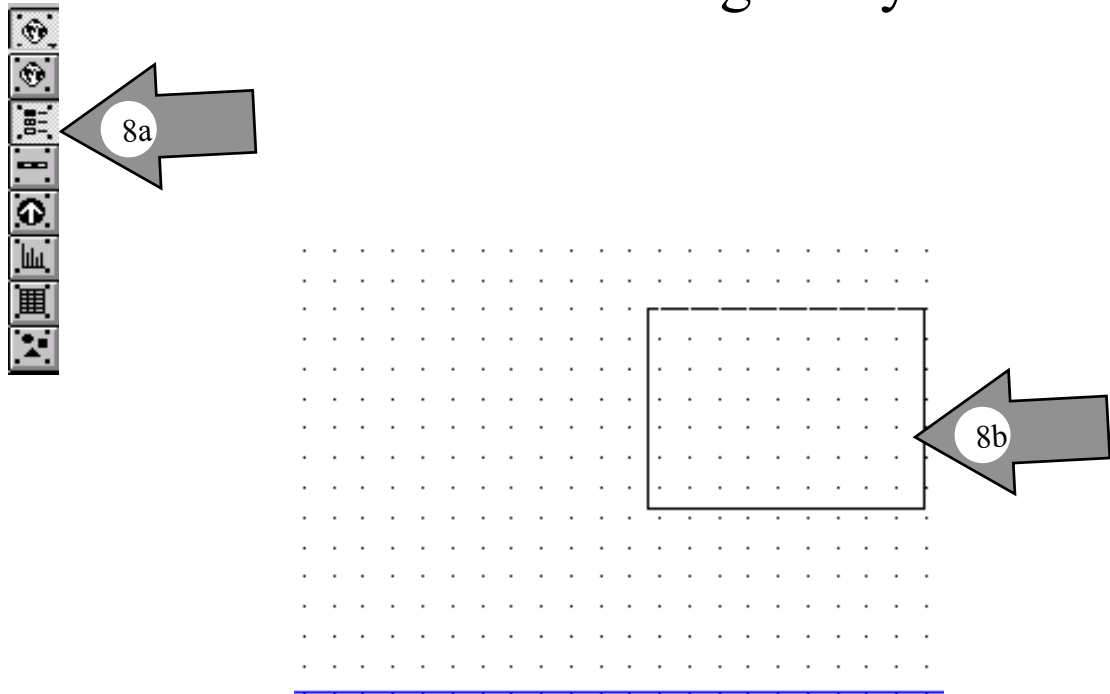Now you're ready to add some map components.

Exercise 9 - Constructing a Layout
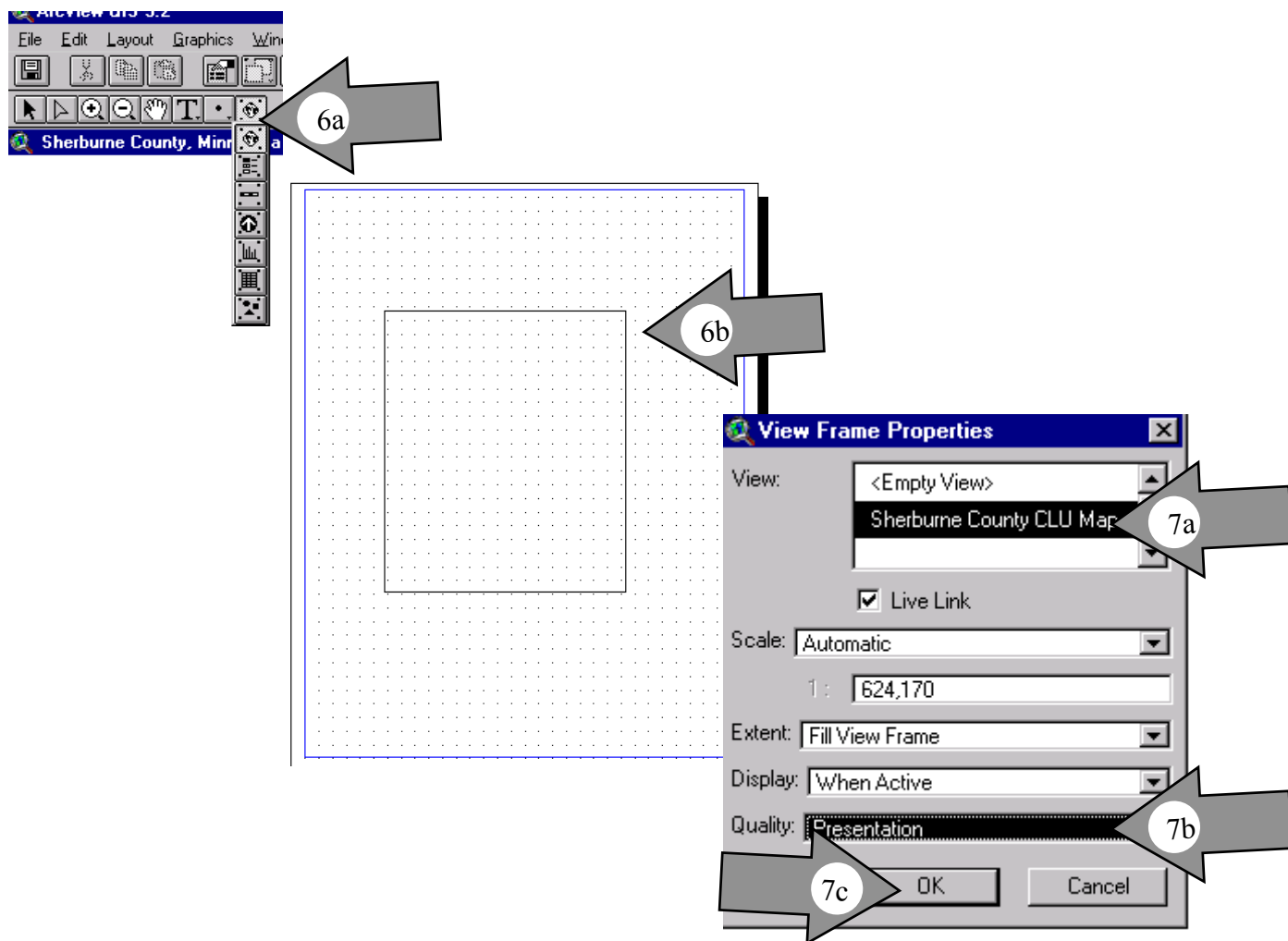
6) Start by adding the "Sherburne County CLU Map" View to the Layout. To do this, make the VIEW FRAME button active (6a), then define an area on the page where you want the map to be displayed, (click and drag a box in the layout page) in this case put the View frame on the left hand side of the display (6b)

7) Once you release the mouse, the View Frame property sheet will be displayed (7a). Set the View to "Sherburne County CLU Map" (7a) and the display quality to "Presentation" (7b). Setting to Draft may result in faster re-draws when dealing with a large file.

   Click the OK button to apply and close the property sheet (7c).

Exercise 9 - Constructing a Layout

8a

8b

Legend Frame Properties

| View Frame: | <Empty Legend> |
| | ViewFrame1: Sherburne County CLU Map | 8c |

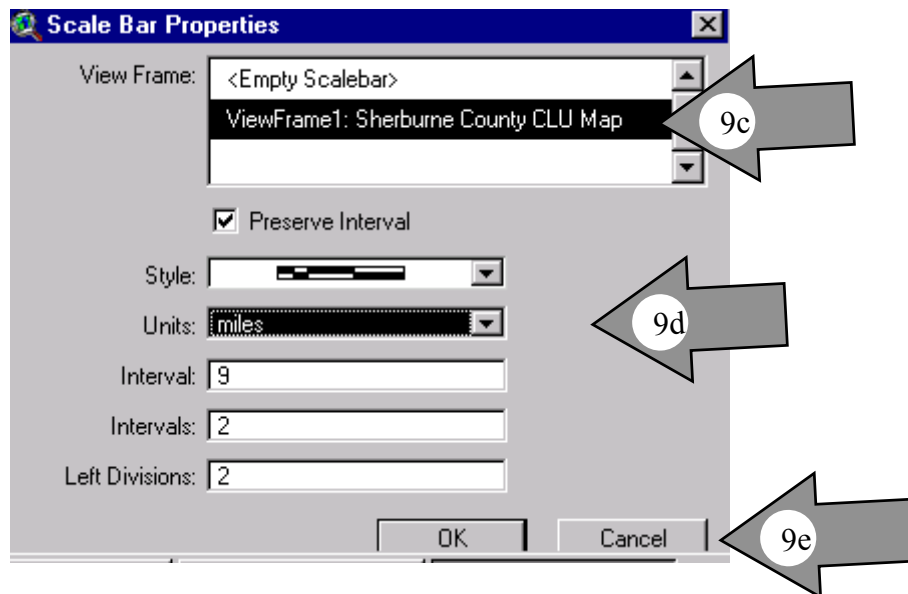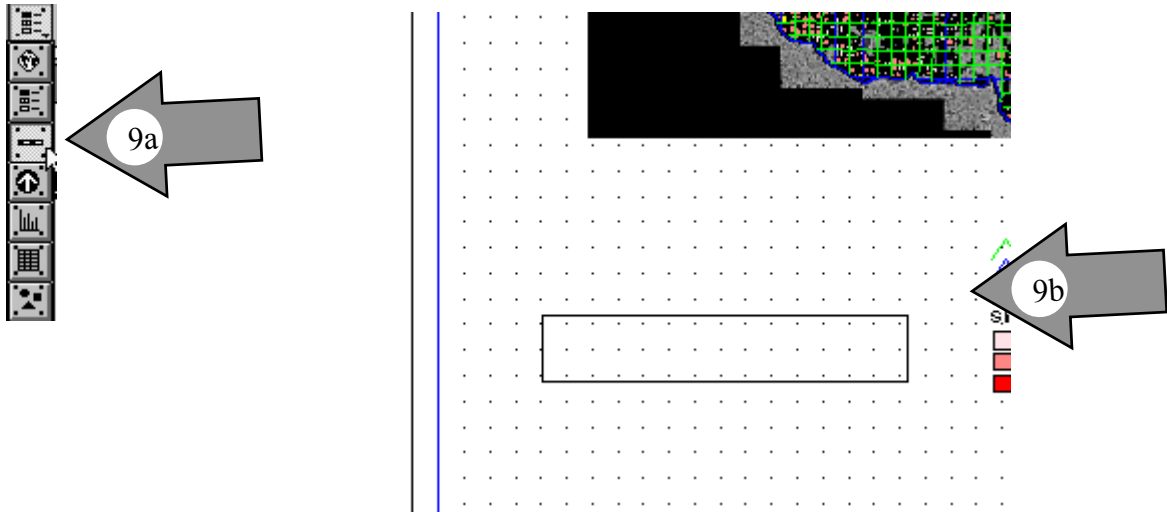| Display: | When Active |
| Quality: | Presentation |

OK   Cancel

8d

8) Now add a Legend for the View using the Legend Frame Tool (8a).
Place the legend just to the right of the View Frame (8b). Use the
legend for the View Frame "Sherburne Count CLU Map Data Set (8c).

Press the OK button to apply and dismiss the Legend Frame property
sheet (8d).

Before moving any further, save your project!!!!!!!!

Exercise 9 - Constructing a Layout

Scale Bar Properties

|	
View Frame:	<Empty Scalebar>
	ViewFrame1: Sherburne County CLU Map (9c)
	☑ Preserve Interval
Style:	
Units:	miles (9d)
Interval:	9
Intervals:	2
Left Divisions:	2

OK   Cancel (9e)

9) Now add a Scale Bar frame for the View using the Scale Bar Frame Tool (9a). Place the scale bar underneath View Frame (9b). Use the legend for the View Frame "Sherburne County CLU Map Data Set (9c).

Set the scale bar properties as close to the above property sheet as you can get them (9d). They probably won't be the same.

Press the OK button to apply and dismiss the Scale Bar Frame property sheet (9e).

Exercise 9 - Constructing a Layout


North Arrow Manager

Rotation Angle: 0 degrees
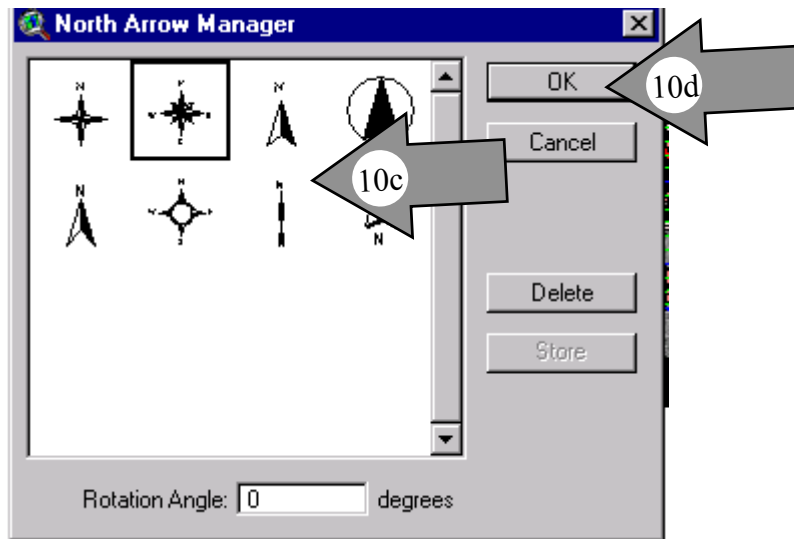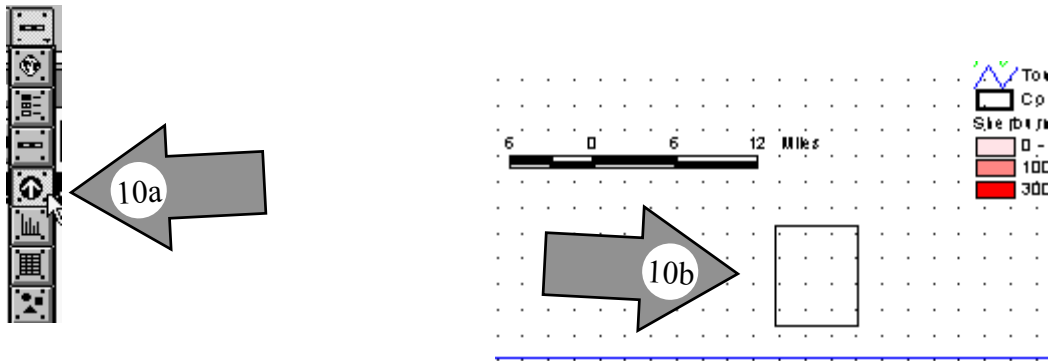
10) Now add a North Arrow frame for the View using the North Arrow Frame Tool (10a). Place the north arrow underneath legend frame (10b). Use any north arrow you would like with no rotation factor (10c).

Press the OK button to apply and dismiss the North Arrow Frame property sheet (10d).

Before moving any further, save your project!!!!!!!!!
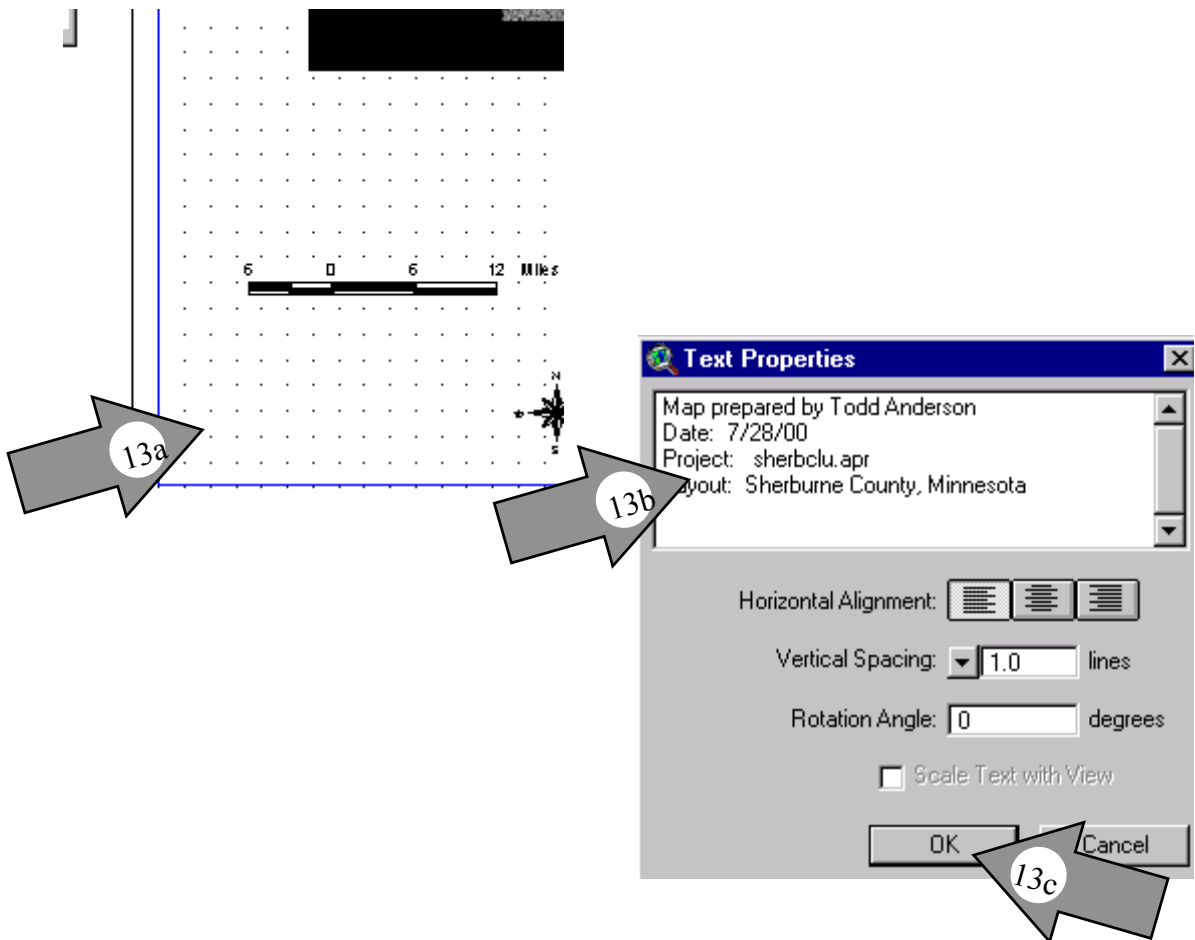
Exercise 9 - Constructing a Layout
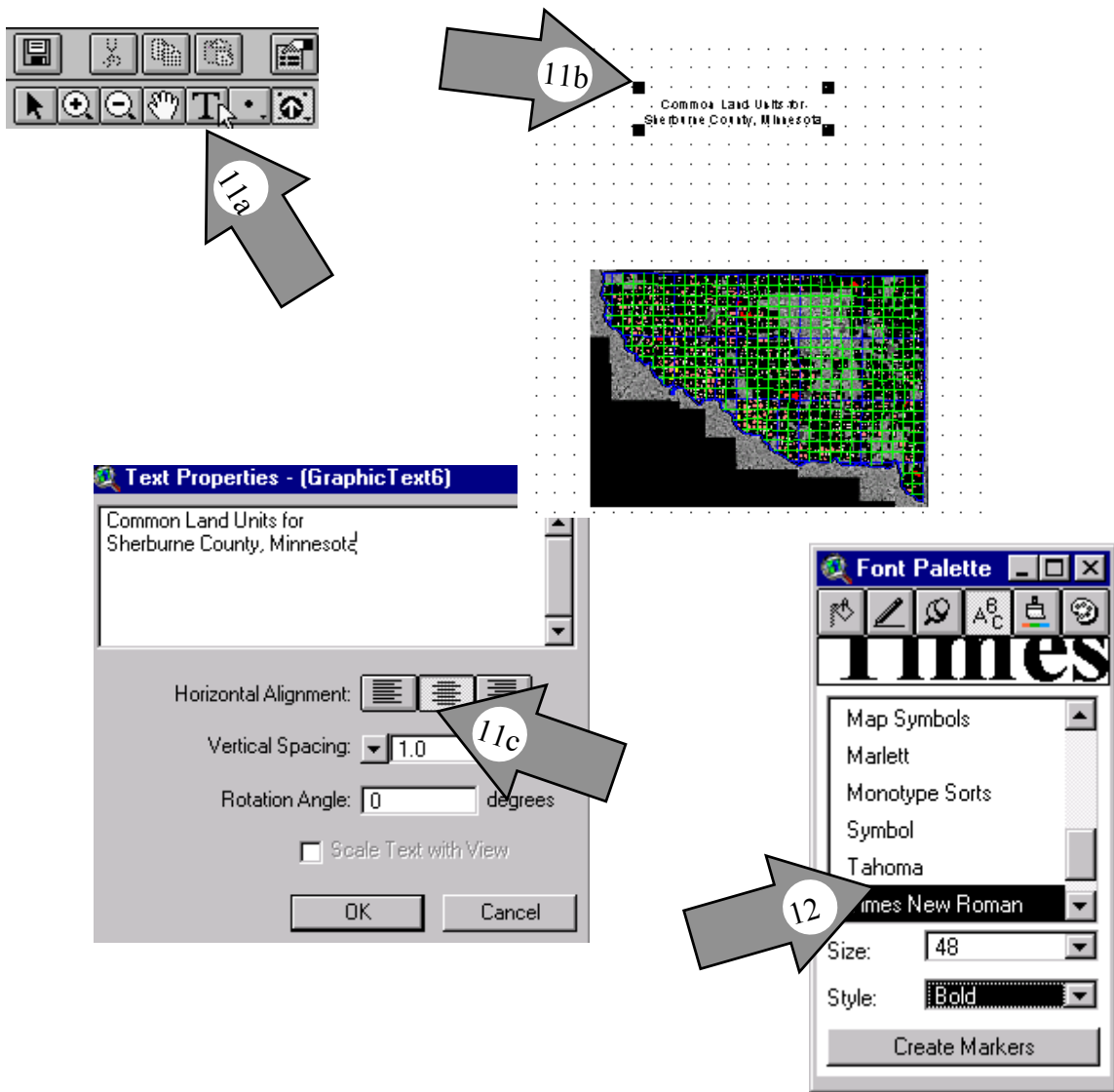
11) Now add a Title for the map using the Text frame Tool (11a). Place the title above view frame (11b). Type in the text "Common Land Units for Sherburne County, Minnesota" as two lines and make the text centered (11c).

   Press the OK button to apply and close the text property sheet (11d).

12) A little small huh? Well, to change it, select the **WINDOW** menu, *Show Symbol Palette* option to display the Palette Manager. Then use the Text palette to change the text style to a BOLD Times New Roman font that is 48 points tall (12).

Exercise 9 - Constructing a Layout

Text Properties

Map prepared by Todd Anderson
Date: 7/28/00
Project: sherbclu.apr
Layout: Sherburne County, Minnesota

Horizontal Alignment:

Vertical Spacing: 1.0 lines

Rotation Angle: 0 degrees

☐ Scale Text with View

OK   Cancel

6   0   6   12 Miles

13) Now add some comments for the map using the Text frame Tool.
What we want to add is your name, the date, the project and the layout
for this map.

Place the comments as small text in the lower left hand portion of the
map (13a). Fill in the property sheet with the following information
(13b):

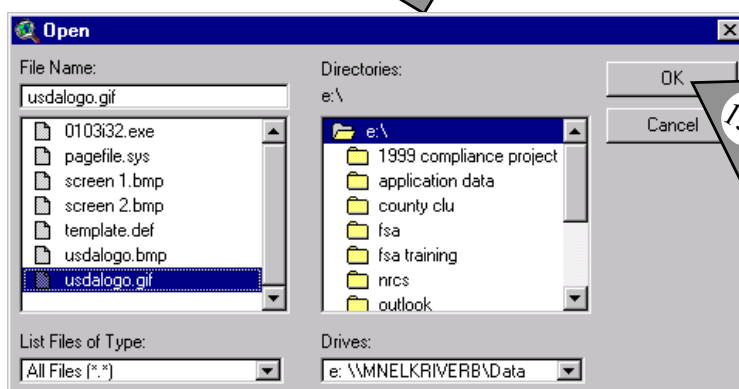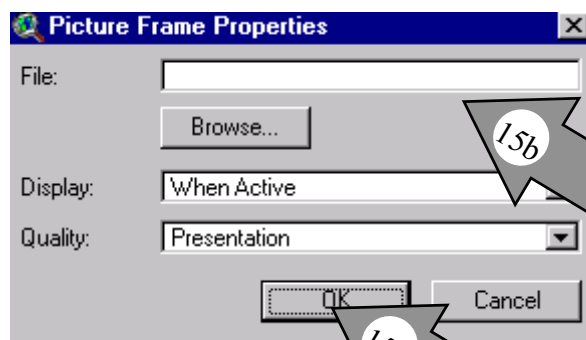   Map prepared by: <your name>
    Date: <enter the date>
   Project: sherbclu.apr
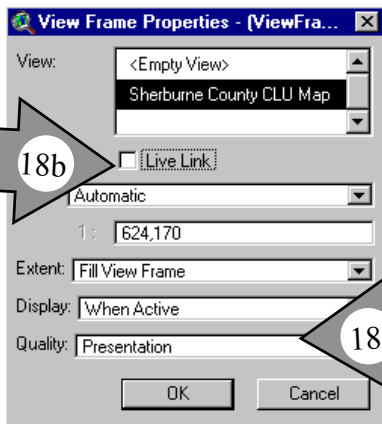   Layout: Sherburne County, Minnesota

Press the OK button to apply and dismiss the text property sheet (13c).
Having trouble seeing the text? Zoom in to get a better look.

Exercise 9 - Constructing a Layout

14) We also want to display a USDA logo. People should know where these maps came from and a logo does a good job of communicating this. There are a couple of ways to do this. You can make a View, put the theme into the view or you could bring in a bitmap or GIF image. We will be bringing in an image.

15) Click on the Picture Frame (15a) and click and drag on the layout where you want the logo to be placed. A property sheet will appear and ask you to maneuver to the directory where the logo is located (15b). When it is found click OK on the second pop-up box. (15c) Once the File, Display, and Quality are filled in the way you want, click OK on the property sheet. The Logo will appear in your layout.

Exercise 9 - Constructing a Layout
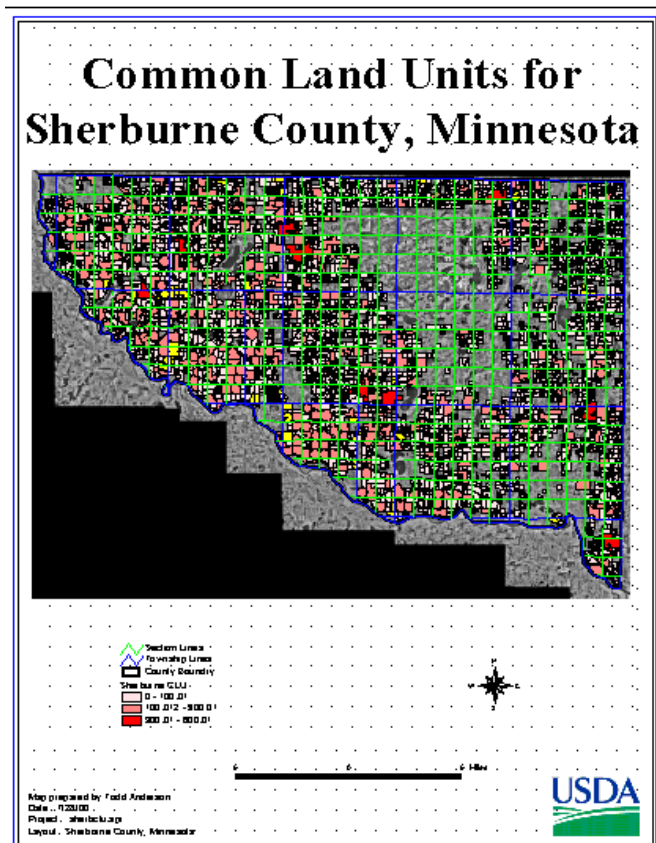
18) Now let's turn the "Sherburne County, Minnesota " on by modifying the property sheet for that frame. Access the property sheet by double-clicking somewhere on the area that the frame occupies. Change the properties to show the data as *Presentation* rather than draft, if it is not there already, (18a) and also turn the *Live Link* off (18b) so that the map doesn't change if we modify the View (which is probable).

19) You can move any of the frames you added around. You can also re-size them if the do not look right. You may also want to add a neatline to make it more organized. This is your chance to be creative.

20) There! Done, save this puppy before you do anything else.

Exercise 9 - Constructing a Layout
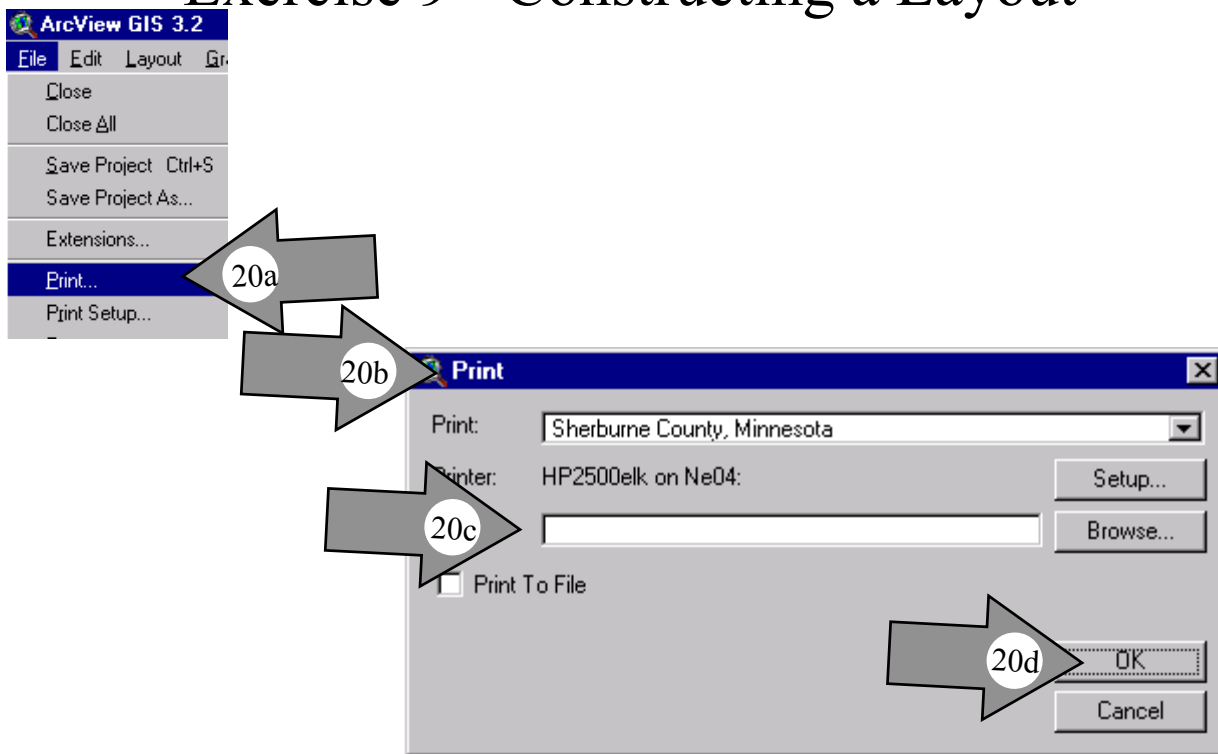
20) Now that your project is saved let's print the map! Use the **FILE**
menu, *Print* option (20a) to access the Print dialog box (20b). If
everything on the Print dialog box is right you can click OK.

You could also print to a file by naming a path way to where you
want the file to be saved. Then name it. (20c).

Press the OK button to print the map to the file (20d).

At this time you will have to sit back and wait. It'll take a little time
for ArcView to process this map. Talk to your instructor about getting
the file printed. Depending on the situation, we might get to print it
and we might not.

When ArcView comes back, close all the documents in your project,
then save the project and quit ArcView.

Exercise 9 - Constructing a Layout

Notes and Comments.